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PROCEEDINGS

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AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLVIII—No. 2

February, 1922

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OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XLVIII—No. 2.

FEBRUARY, 1922

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1922

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TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill, W. C. Cushing, W. M. Dawley, H. E. Hale, Robert W. Hunt, J. B. Jenkins, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, G. J. Ray, Albert F. Reichmann, H. R. Safford, Earl Stimson, F. E. Turneaure, J. E. Willoughby.

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The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

HEADQUARTERS OF THE SOCIETY—33 WEST THIRTY-NINTH STREET, NEW YORK.
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AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

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MINUTES OF MEETINGS OF THE SOCIETY

REPORT IN FULL OF THE SIXTY-NINTH ANNUAL MEETING, JANUARY 18TH, 19TH, AND 20TH, 1922.

Wednesday, January 18th, 1922 (10 A. M.).—The Sixty-ninth Annual Meeting was called to order in the Auditorium of the Engineering Societies Building, 33 West 39th Street, New York City; President George S. Webster in the chair; Elbert M. Chandler, Acting Secretary; and present also about 560 members.

THE PRESIDENT.—The meeting is called to order. I announce the appointment of the following as Tellers to canvass the ballot for the Annual Election: W. G. Grove, *Chairman;* C. S. Bilyeu, A. W. Carpenter, Ralph H. Chambers, C. E. Conover, R. de Charms, Myron E. Fuller, R. R. Graham, H. P. Hammond, George Perrine, F. W. Perry, D. H. Sawyer, and George L. Sawyer.

The Tellers are counting the ballots and their report will be presented before the close of the meeting.

The Acting Secretary will now read the report of the Board of Direction.

THE ACTING SECRETARY.—Mr. President, the report of the Board of Direction has been printed and distributed. I take it that it is not necessary to read it in full.

(The Secretary presented the report of the Board of Direction.*)

THE PRESIDENT.—Gentlemen, you have heard the report of the Board of Direction; what is your pleasure?

F. S. CURTIS, PAST-PRESIDENT, AM. SOC. C. E.—I move the report be accepted.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded that the report be accepted. All those in favor will give assent by saying "aye"; contrary, "no". The motion is carried.

The next business is the report of the Acting Secretary.

THE ACTING SECRETARY.—Mr. President, this report appears in the same pamphlet with the report of the Board of Direction. It is merely a detailed statement of receipts and expenditures during the year.

(The Acting Secretary read his report.†)

In addition to what is shown in the report, several requests have been received that the manner in which the Society's money is received and expended be indicated by percentages, and that has been tabulated as follows:

Under receipts: Entrance fees, 7.03%; dues, 74%; sale of publications, 1.8%; sale of badges and certificates, 1.9%; rent from Fifty-seventh Street property, 8.7%; Annual Meeting, 0.6%; interest, 0.6%; miscellaneous, 5.1%.

Under expenditures: Salaries of officers, 3.9%; clerical help, 15.3%; publications, 27.7%; postage, 5.4%; general printing, 4.0%; furniture and office supplies, 2.3%; badges and certificates, 1.9%; rent, 4.2%; Library and Reading Room, 3.7%; meetings, 0.8%; mileage of Directors, 4.8%; work of committees, 5.7%; Annual Meeting and Annual Convention, 2.1%; interest on mortgage on Fifty-seventh Street property, 3.8%; current business, 1.4%; Employment Bureau, 1.1%; retirement allowance, 2.9%; and miscellaneous items, 9.0%.

THE PRESIDENT.—Gentlemen, you have heard the report of the Acting Secretary, what action do you wish to take?

C. W. HUDSON, M. AM. SOC. C. E.—I move it be accepted.

(Motion duly seconded.)

THE PRESIDENT.—All those in favor of the motion will give assent by saying "aye"; contrary, "no". The motion is carried.

* See p. 183.

† See p. 190.

The next is the Treasurer's report.

(The Treasurer presented his report.*)

THE PRESIDENT.—Gentlemen, you have heard the report of the Treasurer, what is your pleasure?

(It was moved and seconded that the report be received.)

THE PRESIDENT.—It is moved and seconded that the Treasurer's report be received. All those in favor of the motion will give assent by saying, "aye"; contrary, "no". The motion is carried.

Gentlemen, it might be in order at this time to state some of the actions taken by the Board of Direction at its meetings on January 16th and 17th, 1922. The President was authorized to appoint a committee of seven to make a final report within the year on Fire Protection and Fire Prevention. This Committee is to consider the report made to the National Fire Protection Association on November 7th, 1921, on the fire hazards of docks, piers, and wharves, in co-operation with the committees of other associations, to analyze the regulations proposed in the report, their general adoption, and future expenses.

The question of the appointment of a Committee on Stresses for Structural Steel was referred to the Research Committee. It was decided to continue the Committee on Licensing of Engineers until the next general meeting of the Board of Direction to be held probably in March or April, 1922.

A new method of computation was adopted, which simplifies the manner in which applications for membership are now acted on, and which will enable the Membership Committee, it is believed, to classify them much more intelligently. The Committee considering the possibility of creating a Benevolent Fund was continued, and further report will be made at a later meeting of the Board of Direction.

A report from the Committee of the Board on the Promotion of the Technical Interests and Activities of the Society was received and adopted. This report covers an extensive program for extending the activities of the Society during the coming year, and, particularly, has recommended a plan for interesting the younger men in the activities of the Society.

A committee was appointed and continued to arrange for the purchase of a bust of the late James B. Eads, F. Am. Soc. C. E., to be placed in the Hall of Fame, of New York University, where the tablet was unveiled in 1921.

Early in the season, the Society was invited to appoint two representatives to meet with representatives of other technical societies, in an endeavor to form a Uniform Code of Ethics. This Committee reported, and the carrying out of its recommendations was referred to the incoming Board of Direction. In this connection, it was also recommended that a committee be appointed on professional conduct of members.

The possibility of establishing a new Employment Bureau was suggested by the Federated American Engineering Societies, and the Board of Direction appointed a representative to attend the meetings and report on the

* See p. 194.

activities. This report is now being formulated and will be presented for final action at a later date. The President was appointed as one of the representatives of the Society at a meeting of the representatives of the other three Founder Societies, the American Society for Testing Materials, and the Engineers Club of Philadelphia, to be held in Philadelphia, Pa., on February 9th, 1922, to formulate plans for an International Congress to be held in Philadelphia in 1926. The appointment of another member of this Committee was also authorized.

Past-President Davis was appointed as a representative of the Society at a conference of Red Cross Societies concerning Flood Protection.

The next business will be a report of the Committee to Recommend the Award of Prizes and the action of the Board of Direction relative thereto. The Secretary will read the report.

"REPORT OF THE COMMITTEE TO RECOMMEND THE AWARD OF MEDALS AND PRIZES FOR THE YEAR 1921

"DECEMBER 17TH, 1921.

"MR. GEORGE S. WEBSTER,
President, AMERICAN SOCIETY OF CIVIL ENGINEERS,
33 West Thirty-ninth Street,
New York City, N. Y.

"SIR.—Under date of May 23d, 1921, Acting Secretary Elbert M. Chandler notified the subscribers hereto, namely, J. C. Nagle, H. L. Haehl, and W. Easby, Jr., that you had appointed them members of the Committee on Prizes for the year 1921. For reasons of geographical location, it has not been possible for the members of this Committee to meet in personal consultation, but by personal correspondence we have exchanged opinions regarding our estimates of the merits of the papers presented to us for consideration, and, as a result, we submit the following recommendations:

"1.—That no award of the NORMAN MEDAL be made for the year 1921.

"2.—That Fred A. Noetzli, Assoc. M. Am. Soc. C. E., be awarded the JAMES J. CROES MEDAL, for his paper on 'Gravity and Arch Action in Curved Dams'.

"3.—That Ernest E. Howard, M. Am. Soc. C. E., be awarded the THOMAS FITCH ROWLAND PRIZE, for his paper on 'Vertical Lift Bridges'.

"4.—That W. C. Curd, M. Am. Soc. C. E., be awarded the JAMES LAURIE PRIZE, for his paper on 'Bank Protection and Restoration; A Problem in Sedimentation'.

"5.—That no award of the ARTHUR M. WELLINGTON PRIZE be made for the year 1921, in the absence of specific rules formulated by the Board of Direction. Your Committee is of the opinion that neither of the two papers on transportation problems, which were submitted to the Committee for consideration, were of an unusually high order. However, should the rules of the Board of Direction provide that this prize be awarded for the 'most meritorious paper of the year' on the subject of transportation, we would then recommend that this prize be awarded to J. A. L. Waddell, M. Am. Soc. C. E., for his paper on 'Creeping of Railroad Rails'.

"6.—That L. Standish Hall, Jun. Am. Soc. C. E.,* be awarded the COLLINGWOOD PRIZE FOR JUNIORS, for his paper on 'The Probable Variations in Yearly Run-Off as Determined from a Study of California Streams'.

"Respectfully submitted,

"J. C. NAGLE,
"H. L. HAEHL,
"WM. EASBY, JR.,
"Committee on Prizes."

THE PRESIDENT.—The report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, Mr. Robert A. Cummings, Chairman, is the next order of business.

(Mr. Cummings presented extracts from the Progress Report of the Committee.†)

ROBERT A. CUMMINGS, M. AM. SOC. C. E.—I move that the report be received and the Committee continued.

(Motion duly seconded.)

THE PRESIDENT.—The motion is that the report be received and the Committee continued. The motion is now open for discussion. If there is no discussion, all those in favor of receiving the report and continuing the Committee will give their assent by saying "aye"; contrary, "no". The "ayes" have it. The report is received and the Committee continued.

The Report of the Special Committee on Stresses in Railroad Track, Professor A. N. Talbot, Chairman.

A. N. TALBOT, PAST-PRESIDENT, AM. SOC. C. E.—The report is as follows:

"PROGRESS REPORT OF SPECIAL COMMITTEE TO REPORT ON STRESSES IN RAILROAD TRACK

"The Special Committee to Report on Stresses in Railroad Track, cooperating with similar committees of the American Railway Engineering Association and the American Railway Association, presents the following report of progress:

"The principal work of the year 1921 has been the reduction and correlation of the data of the field tests made in 1920. It will be recalled that tests were conducted on the tracks of the Illinois Central Railroad in Illinois, the Delaware, Lackawanna and Western Railroad in New Jersey, and the Atchison, Topeka, and Santa Fe Railroad in New Mexico and Iowa. These tests were made on tangent track and curved track, several different curvatures being used. A principal purpose of the tests was to find the effect of curvature of track on the stresses in the rail (including lateral bending stresses) caused by locomotives of different types run at different speeds, as compared with the stresses developed in straight track. The time required for the reduction of the large amount of data accumulated in the tests has been much greater than was anticipated. The work has been carried on steadily by the Staff, however, and good progress has been made. It is hoped that the Committee will be able to present another report during this year. The results found indicate that information of value on stresses developed in curved track may be expected. Another line of work carried on is the investigation of rail

* Now Assoc. M. Am. Soc. C. E.

† The Progress Report of this Committee will be published in *Proceedings* for March, 1922.

joints. Laboratory tests have been conducted with various types of rail joints, the purpose of the tests being to find the way in which the joints act and to learn the magnitude of stress developed in the various parts of the rail joint at ordinary wheel loads—a type of investigation that it is believed has not previously been attempted. A few field tests have been conducted on the Illinois Central Railroad to connect up the laboratory tests with the action of the joint in the track under wheel loads. Interesting results have been developed in the rail-joint tests.

"The Committee has a number of other questions under consideration.

"Respectfully submitted,

"The Special Committee on Stresses in Railroad Track,

"By A. N. TALBOT, *Chairman.*"

Mr. President, I move that the report be received and the Committee continued.

(Motion duly seconded.)

THE PRESIDENT.—Gentlemen, it has been moved and seconded that the report of the Special Committee on Stresses in Railroad Track be received and the Committee continued. Is there any discussion? All those in favor of the motion will give their assent by saying, "aye"; contrary, "no". It is so ordered.

Gentlemen, the time has arrived for the ceremony of conferring Honorary Membership. I shall ask the Committee in charge to come up on the platform. Gentlemen, the first certificate of Honorary Membership is to be awarded to M. Charles Prosper Eugene Schneider, of Paris, France, through His Excellency Jules J. Jusserand, Ambassador Extraordinary and Minister Plenipotentiary of France, represented by Brevet Major Dubreuil, Military Attaché to the French Embassy.

J. VIPOND DAVIES, M. AM. SOC. C. E.—Mr. President and Gentlemen: I ask permission to present to you for the award of Honorary Membership, M. Charles Prosper Eugene Schneider. In the unavoidable absence of M. Schneider, he is represented here to-day by Brevet Major Dubreuil. The world owes a great debt to France for the mechanism of construction prior to the World War, as well as for its great participation in the war, in which Americans shared the burdens of the fight and the glories of the victory. To the honor of France and its glorious works, the Board of Direction has in its wisdom chosen as her representative the outstanding leader in the Profession of Engineering, M. Charles Prosper Eugene Schneider, upon whom to confer the highest dignity and honor which this Society can bestow, that of Honorary Membership. The work of M. Schneider, head of the great Creusot Works would entitle him to prominence in the profession. In large measure, the Society has already recognized the eminence of M. Schneider in the Profession of Engineering by participation in the award already made to him of the John Fritz Medal for the current year. In no less measure does M. Schneider deserve this recognition as one of the world's leading metallurgists for his work in the development of materials of construction, which is of such vital importance to the Engineering Profession. Since the conclusion of the war, M. Schneider has turned the resources of his great works to the

arts of peace, to the restoration of war damage, and to the development of modern industry. In honoring M. Schneider, we honor ourselves. I present him to you.

THE PRESIDENT.—In recognition of the achievements of Charles Prosper Eugene Schneider in the Engineering Profession, as outlined by Mr. Davies, I have the honor, in behalf of the American Society of Civil Engineers and by authority of its Board of Direction, to present to you this certificate of Honorary Membership for M. Schneider. It is signed by the President and the Acting Secretary.

BREVET MAJOR DUBREUIL.—I thank you, Mr. President, and Gentlemen. I feel greatly honored to have been chosen by His Excellency M. Jusserand to represent France, M. Jusserand, and M. Schneider here. On this occasion, I cannot better express the gratitude of M. Schneider, and of France at large, than to read the following message that has been sent by M. Schneider for this occasion:

"To the Council and Members of the American Society of Civil Engineers I send most heartfelt thanks for the distinction you have conferred on me by electing me to Honorary Membership in the Society, an honor which I value very highly.

"I have big interests in the field of civil engineering, and none lies closer to my heart. Because of this community of feeling between us, I should have particularly enjoyed acknowledging in person the testimonial of this Honorary Membership.

"I like to think that this tribute to a Frenchman is addressed to the whole Engineering Profession of France, and is a new link between the civil engineers of our two countries, who have so often found admiration in each other's work. The Suez and Panama Canals will forever stand as testimonies to their achievements. Now, that we can again dedicate all our forces to works of peace, let us hope we shall accomplish still greater things for the benefit of the world."

THE PRESIDENT.—The Certificate of Honorary Membership will now be presented to Luigi Luiggi, M. Am. Soc. C. E., through His Excellency, Vittorio Rolandi Ricci, Ambassador Extraordinary and Minister Plenipotentiary of Italy, represented by Commander T. F. Bernardi, Italian Consul-General in New York City. The Chair will recognize Mr. John William Lieb.

JOHN WILLIAM LIEB, M. AM. SOC. C. E.—Mr. President, Your Excellency, the Consul General of the Kingdom of Italy, Fellow Members of the American Society of Civil Engineers: I have the honor, sirs, of presenting to you *in absentia,* as an Honorary Member of this Society, Dr. Luigi Luiggi, Professor of Hydraulic Engineering at the University of Rome, Grand Officer of the Royal Order of the Crown of Italy, and Member of the Italian Parliament. An eminent civil and hydraulic engineer, Dr. Luiggi has rendered distinguished public service to his own country, and, through his professional achievements in many lands, has contributed notably to the advancement of the dignity and honor of our Profession. A cosmopolitan spirit, with a broad appreciation of beauty in design, excellence in workmanship, and adaptability to purpose in engineering construction, he is keenly alive to the growing importance which the engineer is assuming in the economic life of nations. He is himself a distinguished exemplar of the successful engineer achieving wide

recognition and attaining high public office. Dr. Luiggi is an ardent admirer of American engineering practice, and on the occasion of a recent visit to the United States, took occasion to inspect minutely the Catskill Aqueduct, east of the Hudson River, examining with much care the design, materials, and workmanship of the Kensico Dam, and manifesting the greatest pleasure at seeing the old Croton Dam about which he had lectured and had pictured to his students in the University of Rome for many years past, and which he now saw for the first time.

In thus honoring members of the Profession who have achieved distinction in foreign lands, this Society takes a further step forward in solidifying international professional relationships and makes effective the old saying that "science knows no geographical boundaries", by recognizing distinguished professional achievement in public service accomplished under any National flag.

It is, therefore, a distinguished honor, Sirs, to present Dr. Luiggi as a worthy addition to the many illustrious names on the list of Honorary Membership in the American Society of Civil Engineers, and I thank the Society most heartily on behalf of our Italian engineering confrères, for the distinguished compliment you have paid the Engineering Profession in Italy by the distinction you have now conferred on one of its most eminent and highly honored representatives.

THE PRESIDENT.—In recognition of the achievements of Dr. Luigi Luiggi in the Engineering Profession, as outlined by Mr. Lieb, I have the honor, in behalf of the American Society of Civil Engineers and by authority of its Board of Direction, to present to you for Dr. Luigi Luiggi this certificate of Honorary Membership, which has been signed by the President and Acting Secretary of the Society.

COMMANDER T. F. BERNARDI.—Mr. Chairman, Distinguished Guests, and Gentlemen: It is a great privilege for me to accept in the name of His Excellency, the Italian Ambassador, the Certificate of Honorary Membership, which your Society has conferred on the Hon. Luigi Luiggi. I feel highly honored, and I wish I could express adequately my gratitude. Dr. Luiggi has already wired your distinguished President his thankful acceptance of the honor which has been conferred on him.

You are honoring one of the foremost Italian engineers of the day, and it seems to me that you should note with sympathy the fact that in Dr. Luiggi you are not only honoring a foreigner, an Italian, but you are honoring a descendant of those old Romans who built those aqueducts which to-day cross the Roman Campagna and which are in parts still utilized; and I am very happy to remind you that Dr. Luiggi teaches the science of engineering on the classical soil of Rome and under the shadow of these same aqueducts which furnished the first examples of engineering, and which to-day are the only examples of practical engineering which survive of the olden time.

I am sure this thought would be very gratifying to Dr. Luiggi himself. It certainly affords me great pleasure to place it before you. I renew in the

name of Dr. Luiggi, my most heartfelt thanks for the honor thus conferred on him.

THE PRESIDENT.—The Certificate of Honorary Membership will now be presented to Samuel Rea, M. Am. Soc. C. E. The Chair recognizes Col. William J. Wilgus.

WILLIAM J. WILGUS, M. AM. SOC. C. E.—Mr. President, among those selected for admission, on this occasion, to Honorary Membership in the Society, is one whose accomplishments as an engineer and administrator eminently fit him for that high degree. For fifty years he has been intimately associated with the Pennsylvania Railroad, with which he has risen from the lowly rank of Rodman to the proud position of President. To his technical skill and creative genius in a pronounced degree is to be credited not only the general development of that great system of transportation, but also many outstanding accomplishments, among which are numbered the monumental work that includes the entry of his Company into the heart of New York City and direct communication with New England, comprising those tunnels under the North and East Rivers, this development of stations on Manhattan, and the striking plan that connects New York and New England by the bridge at Hell Gate. It is with a deep sense of appreciation, Mr. President, that I now avail myself of the honor of presenting to you, our fellow member, Dr. Samuel Rea, President of the Pennsylvania Railroad.

THE PRESIDENT.—Mr. Rea, in recognition of your achievements in the Engineering Profession, as outlined by Col. Wilgus, I have the honor, in behalf of the American Society of Civil Engineers, and by authority of the Board of Direction, to present to you this Certificate of Honorary Membership, which has been signed by the President and the Acting Secretary.

SAMUEL REA, HON. M. AM. SOC. C. E.—Mr. Chairman, Fellow Members of the Society: Among the most cherished associations of a rather long career, I have always cherished membership in this Society and taken a deep interest in its affairs; not so closely allied, but still another Society in which I have been interested for many years, and of which I have the honor to be a member, is the Institution of Civil Engineers. You may understand, therefore, my feelings at this time and my gratification at the recognition of whatever work I may have done, to warrant this honor and distinction which you have conferred on me, and which I regard as the greatest I have yet received. I thank you.

THE PRESIDENT.—The Certificate of Honorary Membership is conferred on Mr. Ambrose Swasey. The Chair recognizes Mr. Charles T. Main.

CHARLES T. MAIN, M. AM. SOC. C. E.—Mr. President, it is my privilege and pleasure to present for Honorary Membership one who has been intimately connected with the Engineering Profession for many years, and who probably is more widely known therein than any other engineer in the United States.

He learned the machinist trade at Exeter, N. H., and, in 1870, entered the employ of the Pratt and Whitney Company. He soon had charge of the gear work for that Company, and, while in this position, he invented new and valuable machines for gear cutting.

In 1880, the firm of Warner and Swasey was formed in Cleveland, Ohio, and began the manufacture of machine tools.

In addition to this business, Warner and Swasey have given special attention to the construction of high-class astronomical instruments and have introduced many new features in the construction of equatorial telescopes, which have made them famous in the United States and abroad.

The man we are to honor has invented and perfected a dividing engine, capable of automatically dividing circles up to 40 in. in diameter, with an error of less than 1 sec. of arc, telescopic gun sights of various patterns, azimuth instruments, and other instruments of precision for use in sea-coast defense for the United States Government, and a range finder, known as the "Swasey range finder," for determining the position and distance of a ship or target within a range of 12 000 yd., which also has been adopted by the United States Government.

He has served in high office in many societies and organizations and on juries of award in the United States, has received honorary degrees and honorary memberships here and abroad, and has been decorated twice by the French Government.

He was the Chairman of the Engineering Delegation to England and France last year and as such did notable work in cementing the friendship between the engineers of Great Britain and France and the engineers of America.

He has established by generous gifts "The Engineering Foundation" for "the advancement of the Engineering Profession and the good of mankind."

In conferring Honorary Membership on representatives of other branches of the Profession, the Society broadens its scope of interest, which, in turn, tends to cement the friendship of the different branches of the Profession.

And now, to-day, Mr. President, the American Society of Civil Engineers is desirous of honoring this man—and itself—by conferring Honorary Membership on Ambrose Swasey.

THE PRESIDENT.—Mr. Swasey, in recognition of your genius in the Engineering Profession, as outlined by Mr. Main, I have the honor, on behalf of the American Society of Civil Engineers and by authority of the Board of Direction, to present to you this Certificate of Honorary Membership, which has been signed by the President and Acting Secretary of the Society.

AMBROSE SWASEY, HON. M. AM. SOC. C. E.—Mr. President, Mr. Main, Distinguished Guests, and Members: I appreciate indeed this high honor, and I am proud to become a member of your great Society, the history of which extends over a period of seventy years and which records among its members so many honorable men of the Alma Mater of the Engineering Profession of America. I am indeed very happy to receive this recognition and this new relationship, and I thank you most sincerely for the honor.

THE PRESIDENT.—The Certificate of Honorary Membership will be conferred on Howard A. Carson, M. Am. Soc. C. E., through his representative, Mr. L. H. Davis. The Chair will recognize Mr. Harrison P. Eddy.

HARRISON P. EDDY, M. AM. SOC. C. E.—Mr. President and Guests, Members of the American Society of Civil Engineers: It is a pleasure to have the

opportunity of presenting for the Certificate of Honorary Membership in this great Society, one of the pioneers of American engineering, Howard Adams Carson. Mr. Carson began his career about eighty years ago in the little town of Westfield, Mass., having been graduated from the Massachusetts Institute of Technology in its second class, in 1869. For a few years thereafter, Mr. Carson was engaged as Assistant Engineer in the City of Providence, in the Water-Works Department, and, later, in the Sewer Department. Shortly after that, he accepted the position of Superintendent of Construction on the Massachusetts Main Drainage Works, one of the earliest of the extensive sewerage works to be constructed in the United States. In that work, he came into intimate contact with heavy and difficult underground construction problems. It was only natural, therefore, in 1889, when the Metropolitan Sewerage District was organized to build the disposal works for the District in and around the City of Boston, that Mr. Carson should be selected as the Chief Engineer for that undertaking, a position which he held from 1889 until 1894, and during which he constructed many difficult underground structures which were among the first of their type to be built.

When the Transit Commission was organized in 1894, Mr. Carson was elected to serve as its Chief Engineer, and during the next fifteen years ending in 1909, he constructed the Tremont Street Subway, in Boston, the first electric car subway to be built in the United States, the East Boston Submarine Tunnel, the first of its kind in this country for that purpose, and the Washington Street Tunnel through the Bayside portion of the City of Boston.

During those years, Mr. Carson was recognized by his associates for his faithfulness and honesty, his tact and fairness, for his engineering skill and achievements; and it is only fitting that the members of this great Society should honor themselves by honoring him, and conferring on him the Certificate of Honorary Membership. I now have the great pleasure and the honor of presenting to you for the Certificate of Honorary Membership in the American Society of Civil Engineers, Howard Adams Carson, through his representative, Mr. L. H. Davis.

THE PRESIDENT.—In recognition of the achievements of Mr. Carson in the Engineering Profession, as outlined by Mr. Eddy, I have the honor in behalf of the American Society of Civil Engineers and by authority of its Board of Direction, to present to Mr. Carson through you this Certificate of Honorary Membership which has been signed by the President and the Acting Secretary of the Society.

L. H. DAVIS, M. AM. SOC. C. E.—Mr. President, and Guests and Fellow Members of the American Society of Civil Engineers: It is a high honor and privilege to me to act to-day as representative of so eminent an engineer, so fine a man, and so true a friend as Mr. Carson. Mr. Carson has asked me to say that he is extremely grateful for the very high honor which this Society has conferred on him, and that he regrets very deeply that, on account of the state of his health, he is unable to leave the South where he is spending the winter, in order to be here to receive in person, this Certificate of Honorary Membership. He asks me further to say, and I want to say that it is characteristic of his modesty and generosity in so doing, that whatever success

has attended his labors was due in large measure to the able associates with whom he was connected and to the able hard-working colleagues whom he had associated with him. Mr. President and Gentlemen, on behalf of Mr. Carson, I thank you.

THE PRESIDENT.—Gentlemen, this concludes the ceremonies of awarding the Certificates of Honorary Membership. We will proceed with the regular business of the Society. I invite the gentlemen to remain on the platform, if they wish. The report of the Special Committee on Highway Engineering, Mr. H. Eltinge Breed, Chairman. The Chairman cannot be present, and the report will be presented by Mr. Langthorn.

J. S. LANGTHORN, M. AM. SOC. C. E.—Mr. President and Members, I present herewith the Tentative Report of the Special Committee on Highway Engineering:

"TENTATIVE REPORT OF SPECIAL COMMITTEE ON HIGHWAY ENGINEERING

"The report of your Special Committee on Highway Engineering again relates chiefly to the functioning and co-operation of the Federal Bureau of Public Roads and the State Highway Departments.

"In last year's report, the Federal highway work was presented in some detail. The two significant features are:

"From 1917, when the first appropriation was made, to 1921, $284 000 000 was appropriated for road work. In 1921, there was appropriated a sum of $90 000 000, $15 000 000 of it for forest roads, and $75 000 000 for straight Federal Aid.

"Second, the Federal Aid appropriation has been made by law not to exceed 50% of the total estimated cost of the road, its maximum contribution to any State being $20 000 per mile. The "fifty-fifty" basis holds except as the new law reads in appropriating $75 000 000 for aid on Post Roads, 'that in the case of any State containing unappropriated public lands exceeding 5 per centum of the total area of all lands in the State, the share of the United States * * * shall not exceed 50 per centum of the total estimated cost thereof plus a percentage of such estimated cost equal to one-half of the percentage which the area of the unappropriated public lands in such State bears to the total area of such State.' According to this sliding scale of percentage, the amount of co-operation required from the Public Land States is decreased in proportion as the area of public lands within their borders is increased. The maximum percentage payable under this law in these States is: Arizona, 61.11; California, 59.32; Colorado, 56.13; Idaho, 58.01; Montana, 53.04; Nevada, 87.23; New Mexico, 61.51; Oregon, 61.13; Utah, 74.85; Wyoming, 64.65.

"The first recommendation of your Committee on Highway Engineering is that the existing relation between the Office of Public Roads and the various State Departments be continued, because the organization is effective and satisfactory results may be attained through it with reasonable rapidity.

"Second, the amount allotted per mile by the Federal Government should be increased from $20 000 to $25 000 per mile, with an additional contribution of one-half of any amount in excess of $10 000 per mile required by grading, drainage, or structures. The legislative habit of appropriating dollar for dollar has tended to make $40 000 roads a maximum product, often as uneconomic as it is thoughtless. Often the extra appropriation is necessary to meet unusual requirements of topography or traffic or to provide suitably for the more durable types of pavement. Failure to consider such needs and to make suitable provision for them means ultimate waste.

"Third, interstate roads and National routes should be paved with durable types where necessary to meet the traffic. Already some States are staggering under the burden of excessive maintenance charges where heavy traffic is falling on semi-durable pavements, and it begins to look as if the Government would have to take over some of the maintenance work in order to save its present investment. It has been proven that increased traffic follows an improved road, and the improvement, to justify its cost, must be strong enough to meet it.

"The last recommendation of your Committee is that the Society as a whole petition Congress for the passage of the bill now before it known as H. R. 8978, providing for an appropriation of $100 000 000 per year for the next five years.

"It is believed that the country as a whole will prosper appreciably through securing these roads, because they will help solve one of our most pressing economic problems, the problem of distribution.

"That the country will secure these roads more economically through a fixed appropriation for five years, because it will permit more comprehensive planning and greater continuity of organization both in Federal and State Departments.

"That such an appropriation will benefit not only Highway Engineers, as it will assuredly and directly, but also other branches of engineering dependent in however remote a degree on highway service and automotive transportation.

"Your Committee believes that should the American Society of Civil Engineers see fit to adopt these recommendations and to further them by whatever means it chooses, it will give a most helpful impetus to highway progress.

"This report is endorsed by every member of the Committee except Mr. John M. Goodell, who writes, 'I learn that there is no objection to my signing an endorsement of the continuation of Federal Aid for five more years. I am still reluctant, however, to sign more than that to present to the American Society of Civil Engineers.'

"H. ELTINGE BREED,
"Chairman."

"Members of Committee:
"JOHN M. GOODELL,
"GEORGE W. TILLSON,
"A. B. FLETCHER."

I move an acceptance of this report and the continuance of the Committee.

MR. HUDSON.—I second the motion.

THE PRESIDENT.—Gentlemen, you have heard the report. It has been moved and seconded that it be received and the Committee continued. Is there any discussion?

H. J. SHERMAN, M. AM. SOC. C. E.—I would like to ask whether or not, if this report is endorsed, it means that the Society stands back of the $100 000 000 appropriation?

MR. LANGTHORN.—Mr. President, when I promised to read Mr. Breed's report, I did not think of the necessity of answering all questions that might be put to him. I would say from a general knowledge of this question that if this meeting adopts a resolution favoring this appropriation of $100 000 000 for five years, it would mean that it believes in that Federal appropriation. Does that answer the question?

MR. SHERMAN.—Well, I do not know whether it does or not. I want to know whether if I vote for this report I commit myself and the members of

the Society to stand back of the proposed appropriation of $100 000 000 for five years.

MR. LANGTHORN.—Not at all.

THE PRESIDENT.—Any further discussion? All those in favor of receiving the report and continuing this Committee give their assent by saying, "aye"; contrary, "no". The "ayes" being in the majority, the report is received and the Committee continued. The Progress Report of the Special Committee on Bridge Design and Construction, Mr. Henry B. Seaman, Chairman.

HENRY B. SEAMAN, M. AM. SOC. C. E.—Mr. President, the report is very brief and it has been printed.* I move the adoption of the report and the continuance of the Committee.

MR. HUDSON.—I second the motion.

THE PRESIDENT.—It has been moved and seconded that the report of the Special Committee on Bridge Design and Construction be received and the Committee continued. Is there any discussion? All those in favor of receiving the report and continuing the Committee will give their assent by saying "aye"; contrary, "no". The "ayes" are in the majority, and it is, therefore, carried. The report of the Special Committee on Contract Standard Clauses, Mr. H. Eltinge Breed, the Chairman of this Committee, is absent, and the report will be presented by Mr. Langthorn, the Secretary of the Committee.

MR. LANGTHORN.—The report is as follows:

"PROGRESS REPORT OF THE SPECIAL COMMITTEE ON GENERAL FORM OF CONTRACT STANDARD CLAUSES.

"The Special Committee appointed by the American Society of Civil Engineers at its meeting in May, 1921, to consider the General Form of Contract Standard Clauses is organized and about to hold its first meeting, on January 19th, 1922. The very much regretted delay in getting to work has been due to exigencies beyond the control of the Committee.

"The time, however, has not been lost. The work and the failures of this past season have proved more conclusively than ever the need of greater standardization in contract clauses, to prevent grave misapprehensions in a rapid reading, and to save the time and meticulous attention to detail now necessary for a safe reading. A danger lies in similar clauses in different contracts that, actually made quite different in intent by a word or a punctuation mark, appear deceptively alike.

"That these difficulties are widely felt is evidenced by the conference called in Washington last month by Gen. Marshall, Jr., of the Associated General Contractors of America, and furthered by Secretary Hoover, to discuss the desirability and practicability of securing greater uniformity in forms of contract for construction work. A report of the first session of this conference made by Mr. J. S. Langthorn is appended.† A second session of this Conference will soon meet, and it is hoped that your Committee will have formulated a plan of co-operation with it.

"The report of the actual work of the Committee now beginning and its recommendations will be made as soon as possible."

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* *Proceedings*, Am. Soc. C. E., December, 1921, p. 683.

† An abstract of this Report is printed in *Proceedings*, Am. Soc. C. E., January, 1922, p. 11.

Mr. President, I move the adoption of this report and the continuance of the Committee.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded that the report be received and the Committee continued. Any discussion? All those in favor of the motion will give their assent by saying "aye"; contrary, "no". The motion is carried. The report of the Alfred Noble Memorial Committee, Mr. Samuel Rea, Chairman; I understand that Mr. George Gibbs will make the report.

GEORGE GIBBS, M. AM. SOC. C. E.—Mr. President, I present the report of the Alfred Noble Memorial Committee as follows:

"PHILADELPHIA, January 13, 1922.

"AMERICAN SOCIETY OF CIVIL ENGINEERS,
"33 West 39th Street, New York City.

"GENTLEMEN.—The Alfred Noble Memorial Committee presented at the Annual Convention of the Society, held at Houston, Tex., in May, 1921, a report setting forth the status of the Committee's work at that date, and submits herewith a further report of progress.

"A formal meeting of the Committee was held in New York City on May 23d, 1921, and a sub-committee was appointed to meet with Mr. Paul Bartlett, the Sculptor, with a view of discussing certain changes in details of the memorial design. As a result, Mr. Bartlett has conferred with Mr. Glenn Brown, the Architect, regarding the proposed revision of the design; Mr. Bartlett has also discussed the subject with two eminent architects and obtained constructive criticism from them. The meetings above mentioned have resulted in certain changes in the memorial, but as the matter now stands the Committee is not yet prepared to submit to the Society a matured design finally approved by them.

"Also, in view of present financial conditions and the continued high cost of labor and materials, the Committee has not thought it desirable to hurry the determination of a final design, as it is thought preferable to devote the time available to working up an appropriate memorial scheme, and to await improved conditions before submitting a plan which may be the basis for soliciting subscriptions from the members of the American Society of Civil Engineers, and associated societies, for the completion of the memorial.

"Through an oversight in giving the Committee membership in the last report, the name of Gen. Harts was omitted; the Chairman has written Gen. Harts explaining the situation and asking him to continue to serve; reply has been received stating that he will be glad to serve and render all possible assistance in helping matters along. The Committee as now constituted consists of the following members: Samuel Rea, *Chairman*, Robert Ridgway, *Secretary* and *Treasurer*, Onward Bates, George S. Webster, *ex-officio*, George Gibbs, F. H. Newell, Hugh L. Cooper, Gen. William W. Harts, and S. H. Hedges.

"Respectfully submitted,

"SAMUEL REA,
"Chairman."

Mr. Chairman, I submit the report for adoption and request the continuance of the Committee.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded that the report be received and the Committee continued. Any discussion? If not, all those in favor will give their assent by saying "aye"; contrary, "no". The motion is carried.

The Counsel of the Society have advised that it is necessary for the Society to pass a resolution changing the number of Directors as provided in the new Constitution, and that this action be taken before the announcement of the election of officers. I will ask the Acting Secretary to present the resolution.

THE ACTING SECRETARY.—This resolution which was prepared by Parker and Aaron, Counsel for the Society, is as follows:

"Resolved, That the American Society of Civil Engineers, a membership corporation, organized under the laws of the State of New York, does, pursuant to the provisions of Section 14 of Chapter 40 of the Laws of 1909, as amended by Chapter 577 of the laws of 1921, hereby determine to change the number of its directors as follows, to wit:

"The Board of Direction, in which the government of the Society shall be vested and who shall constitute the Trustees provided for by the laws under which the Society is organized, shall hereafter be twenty-five (25) in number and shall consist of and be constituted of the President, the four (4) Vice-Presidents, eighteen (18) Directors, and the two (2) latest living Past-Presidents continuing to be members of the Society.

"Further Resolved, That the President and Secretary of this meeting be authorized and directed to sign, acknowledge and file a certificate specifying the foregoing determination and the number of Directors."

ARTHUR P. DAVIS, PAST-PRESIDENT, AM. SOC. C. E.—I move the adoption of the resolution.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded that the resolution be adopted. Any discussion? If not, all those in favor will give their assent by saying, "aye"; contrary, "no". The resolution is adopted. Discussion of the proposed Amendments to the Constitution, submitted to the membership on November 23d, 1921, is now in order.

THE ACTING SECRETARY.—Mr. President, the proposed amendments have been sent to the membership and have also been published in *Proceedings* for December, 1921. They appear in two groups. The first group was prepared by the Executive Committee and the Society's Counsel, and has been presented on the petition of the majority of the members of the Board of Direction and members of the Retired Committee on Referred Amendments. The purpose is to clarify certain minor inconsistencies in the revised Constitution.

THE PRESIDENT.—Gentlemen, do you wish to act on these separately?

MR. HUDSON.—Mr. President, I move we act on them separately.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded that we act on the groups separately. Those in favor of the motion will give their assent by saying, "aye"; contrary, "no." It is so ordered. We will take up Group 1, the amendments offered by the Executive Committee of the Board of Direction to correct minor matters in the Constitution.

RICHARD L. HUMPHREY, M. AM. SOC. C. E.—I move they be sent out to letter-ballot.

J. N. CHESTER, M. AM. SOC. C. E.—In order to bring the matter properly before the meeting, these amendments should be read in detail.

THE ACTING SECRETARY.—"Amend Article II.—Membership: Add Section below, and renumber present Section 9 Section 10:

"9.—The membership status of members of the Society in any grade, as it was immediately prior to November fifth, 1921, shall not be affected by amendments to the Constitution taking effect on that date, except that the Associates at that time shall thereafter be termed Affiliates."

MR. CHESTER.—I move the adoption of that amendment.

MR. HUDSON.—I move to amend that, and move that this amendment be sent out with the recommendation of this meeting that it be approved.

(Motion duly seconded.)

MR. CHESTER.—I accept that amendment.

THE PRESIDENT.—It is moved and seconded that this amendment be submitted to letter-ballot with the recommendation of this meeting that it be approved.

(Motion duly seconded.)

THE PRESIDENT.—All those in favor of the motion will give their assent by saying, "aye"; contrary, "no". The "ayes" have it and it will be so sent out.

THE ACTING SECRETARY.—"Amend Article IV.—Dues: Amend Section 3 by inserting after the first paragraph the following:

"Members residing outside of North America shall pay annual dues as follows: by Corporate Members, twenty dollars; Affiliates, fifteen dollars; Juniors, ten dollars."

The purpose of that proposed amendment is to make certain that there is no question about collecting dues from foreign members.

MR. HUDSON.—I move that this amendment also be sent to letter-ballot with the recommendation of this meeting that it be approved by the membership.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded that this amendment be sent out to letter-ballot with the recommendation of this meeting that it be approved. Are you ready for the question? All those in favor will give their assent by saying "aye"; contrary, "no". It is so ordered to be sent out.

THE ACTING SECRETARY.—"Amend Article VII.—Nomination and Election of Officers:

"Amend Section 4, by inserting in 15th line before the words 'No vote', 'In the first and second canvasses for Official Nominees', making the sentence read:

"In the first and second canvasses for Official Nominees no vote of a Corporate Member for a nominee for Vice-President resident outside of the zone in which the voter resides shall be counted; no vote of a Corporate Member for a nominee for Director resident outside of the district in which the voter resides shall be counted."

MR. HUDSON.—I move that this amendment be sent out to letter-ballot with the approval of this meeting.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded—

A MEMBER.—What is the use of sending these amendments out to letter-ballot?

THE PRESIDENT.—The Constitution requires it. All those in favor of the motion give their assent by saying "aye"; contrary, "no". The "ayes" have it. We shall now take up the second group.

JOHN P. HOGAN, M. AM. SOC. C. E.—Mr. President, I move that the reading of the second group of amendments be dispensed with. They have been printed and sent out to the membership and have been in their hands for thirty days.

(Motion duly seconded.)

THE PRESIDENT.—The motion is that the reading of the second group of amendments be dispensed with as they have been sent out to the membership. It has been seconded.

A MEMBER.—They may have been sent out, but very few remember them.

A MEMBER.—Is there not conflict between that first and second group? And is it not the object of presenting them at this meeting to clear up that conflict, if we can, before they are sent out? In other words, so that amendments that go out to the membership may be voted on without delay. Is not that the purpose of submitting them to this meeting? Is not the discussion of that amendment in order?

THE PRESIDENT.—We have a motion before the house. All those in favor of dispensing with the reading of the amendments in the second group will give their assent by saying, "aye"; contrary, "no". The "noes" appear to have it. Unless there is a division called for, the Chair will decide that the "noes" are in the majority and the Acting Secretary will proceed to read the second group of amendments.

THE ACTING SECRETARY.—"Amend Article VII.—Nomination and Election of Officers:

"Amend Section 1, by striking out of the first paragraph the sentence:

"Members not residing in North America shall be allocated to District No. 1."

MR. HUMPHREY.—Mr. President, I move that this amendment be sent out to letter-ballot. I want to say, Mr. President, that in the districting of the Society it throws into District No. 1, under the Constitution, approximately 2 181 members. Now, it does seem illogical to put men who have their places of business in China, Japan, Australia, and the Orient into the New York District. Members who reside in Canada and Mexico, and other parts of the North American Continent, are put into the districts to which they are contiguous. It would seem logical, therefore, that those members outside of the United States without distinction should be put into those districts to which they are naturally contiguous, and it would simplify the districting of the Society. There are in District No. 1 at the present time resident here 1 606 members. The number is increasing. Why we should add all those foreign members to that District seems to be illogical. Therefore, for the purpose of simplifying that, we should distribute those members living outside of North America just the same as we distribute those living outside of the United States, to the districts to which they are naturally contiguous.

(Motion duly seconded.)

THE PRESIDENT.—It has been moved and seconded that the amendment be sent out to letter-ballot. The subject is now open for discussion.

P. H. NORCROSS, M. AM. SOC. C. E.—Mr. President, I offer as an amendment to that motion that this amendment be referred to the Old Committee on Referred Amendments, which, under the Constitution, will have to report back at the next Annual Convention any discussion of that amendment and numerous other amendments that will probably be discussed this morning. I beg a moment's time to express what I think is the opinion of the members of the Committee and probably of a great many members of the Society relative to the new Constitution, which, under the ruling of the attorneys, became effective on November 5th, 1921. It had not had time to draw one breath before amendments to it were offered. I plead with the members of the Society for an opportunity for the new Constitution to have at least one year of grace, in which to prove whether it is functioning as a new Constitution or is a "flash in the pan". These remarks will apply equally to the second group of amendments which the Acting Secretary will read and which will probably be discussed at length, but which can be eliminated by acting promptly in accordance with the suggestion which I have made. I, therefore, in offering this amendment, suggest that this amendment be referred to the old Committee on Referred Amendments.

MR. HUDSON.—Mr. President, I move to amend, that this amendment be sent to the vote of the Society with the adverse recommendation of this meeting. We have already discussed this matter. Mr. Humphrey spoke in support of his motion. I believe that the foreign members of this Society prefer to be attached to District No. 1, the district in which the office of the Society is located. It is much more convenient for them to correspond with the Society in connection with papers and other affairs, and they should not be attached to the fifteen districts throughout the country, but should be attached to District No. 1. We have already voted on this same amendment. It was voted down at the Annual Convention at Houston.

L. D. RIGHTS, M. AM. SOC. C. E.—I second that motion.

THE PRESIDENT.—The latest amendment is that this amendment to the Constitution be sent out to ballot, with the recommendation of this meeting that it be not approved. I think that is correct, Mr. Hudson, your recommendation was that it be sent out to a vote of the Society with the recommendation that it be not approved? Any discussion on this motion? All those in favor of the second amendment will give their assent by saying "aye"; contrary, "no". The "ayes" appear to have it. The amendment is carried. I think that disposes of the other amendment.

THE ACTING SECRETARY.—"Amend Section 4,—

A MEMBER.—I rise to a point of order. Is it not proper that we vote on the original motion as amended?

THE PRESIDENT.—I suppose it is, if you desire to. The question has been asked, should we not now vote on the original question as amended. All those in favor give their assent by saying "aye"; contrary, "no". The motion is carried.

THE ACTING SECRETARY.—"Amend Section 4, by striking out—

A MEMBER.—I did not have a chance to vote on the other.

THE PRESIDENT.—I called for the vote on the negative side.

THE ACTING SECRETARY.—"Amend Section 4, by striking out the first paragraph and substituting the following:

"Directors shall be nominated by the Corporate Membership of the geographical districts which they are to represent, and may or may not be resident therein.

"Not later than the fifteenth day of April each year there shall assemble in such geographical districts as are entitled to nominate a Director, and in such zones as are entitled to nominate a Vice-President, representatives chosen by the Local Sections therein, which representatives shall have voting power in proportion to the respective memberships of the Local Sections represented.

"These representatives shall constitute the District or Zone Board and shall nominate a candidate or candidates for the office of Director for the said District or for the office of Vice-President for the said Zone and make announcement thereof to the District or Zone membership.

"If there be but one Local Section in the District said Section may nominate its candidate or candidates for Director in such manner, subject to the approval of the Board of Direction, as it may choose.

"Additional nominations may be made by declaration by at least twenty-five Corporate Members of said District or of said Zone forwarded to the said District or Zone Board within twenty days following said announcement.

"A letter ballot containing the names of the candidates so nominated, upon which the nominees of the District or Zone Board shall be designated, shall be mailed by said Board to each Corporate Member in the District or in the Zone not later than May fifteenth, and the ballots received prior to June tenth shall be canvassed by the said Board, and a report of the result thereof, certified by the said Board, shall be presented by the representatives of the Local Sections of said District or of said Zone to the Annual Conference of Representatives of Local Sections."

MR. NORCROSS.—I move that this amendment be sent out to a vote with the recommendation of this meeting that it be adverse.

(Motion duly seconded.)

WILLIAM T. WALKER, M. AM. SOC. C. E.—Walker is my name and I come from Minneapolis. I am glad to see that amendment come up. We have what is known as the Northwestern Section of the American Society of Civil Engineers. There are in the Twin Cities about 100 Members and Associate Members of the Society and the Section was organized in 1914. We have good meetings if something of interest comes up; if, however, there is nothing of special interest, the attendance is very poor. In 1919, a series of excellent meetings was held, because of the interest in getting the Annual Convention in St. Paul and Minneapolis, which we finally did. In October, 1921, at the first meeting, the really important meeting of the year, at which an election of officers was held, there were fourteen members present. The Society has to give these Local Sections some responsibility, or they will cease to exist. To come to a meeting and probably have a dinner and talk over things generally is not going to get the Section anywhere. There is wholly a lack of interest in the Section. I am speaking now for the Twin Cities. You cannot expect members out there to pay $20 for their membership and then $5 more, and, in addition, the cost of the dinner at the meetings. We simply have to have some financial aid from the Parent Society. Now, this responsibility

that was put on the Sections of nominating a Director represents a little bit of an advance, but I think you should put more responsibility on those Sections and give their members a chance to feel that they are really a part of the Society.

MR. HOGAN.—The assumption that putting this responsibility on the Sections will get the members out to meetings is not borne out by the experience of the American Society of Mechanical Engineers. It has a system somewhat similar to that proposed here. I will cite the experience of the Utica District. The Utica District Local Section shows 150 members, who are scattered from Plattsburg to Ogdensburg. It is easier for a man in Ogdensburg to get to New York City than to get to Utica. The result is that there are only 47 of the 150 members of the Section who are within two hours of Utica. At the last meetings called for the purpose of electing representatives, there were present for the last year and a half 8, 8, and 6 members, respectively.

MR. HUMPHREY.—The recommendation that is now before the Annual Meeting is one made by the Committee on Development that was appointed by this Society and made a unanimous recommendation as regards this particular form of procedure. It was passed by the Annual Meeting of two years ago by a favorable vote. It received about seven or six to one vote as to the policy, and received nearly a two-thirds vote of the ballot of 1920. Col. Hogan has said that this did not work out in the American Society of Mechanical Engineers. I have been informed by the Secretary of that Society that the Annual Meeting of the Sections of that Society brought representatives from all those Sections; that they had an extremely interesting meeting. They act as a sort of House of Representatives, and pass on to the Council things which they think should be done. This plan differs from the plan of the Mechanical Engineers in this particular, it is not necessary for the members of the Sections to get together, as Col. Hogan's remark implied. Each Section can delegate its representative, who meets with the representatives of other Sections in the District, to determine whom they want to nominate to the office of director, or in the case of the zone, for the office of vice-president. If the nominations of this body of representatives is not satisfactory, there is still the provision that they can nominate other candidates by declaration of twenty-five men. It does give, as Mr. Walker has stated, something of interest to the Local Sections. The Society for years has been somewhat like an ostrich, and the members of this District No. 1 think the whole body of the Society is carried therein. I was asked this morning by the President of one of the Local Sections whether something could not be done by which the Presidents could get together informally or otherwise, and whether an announcement could not be made by the Chair fixing a time at which representatives of the Local Sections could confer on meetings and stimulate the work of the Society.

I have pleaded before this Society for the Local Sections. I speak for the Philadelphia Section, when I say we want this kind of legislation. We do not ask that this meeting shall vote favorably. We are satisfied to have the motion that was offered by Mr. Norcross go out, with the unfavorable recommendation of the meeting; but we do want this question to go to the members

of the Society and that the members of the Society determine whether or not they want this organization to function this way.

MR. NORCROSS.—Mr. President, I appreciate the remarks of the gentleman from Minneapolis. I am afraid, however, that most of the discussion is beside the real point at issue. As I stated a few moments ago, you have just voted into life a new Constitution. The Committee has provided in that Constitution machinery which it is hoped will stimulate activity in Local Sections. We spent approximately $6 000 in mileage. A Committee of Eight, from Boston on the east to San Francisco on the west, covered 64 000 miles during 1920 and 1921; conferences were had with Sections, with individuals, with members of the Board of Direction, and a new Constitution was drafted and is now effective. Before that Constitution has had time to show its effectiveness or its inability to function, new amendments are offered relegating to the scrap pile what you have spent $6 000 of the Society's funds to get. You have revised your whole clerical organization to make it function. I, therefore, plead with this body to send it out with an adverse report; and I beg of you to give this new Constitution at least twelve months in which to show that it has virtue.

MR. WALKER.—I just want to ask the indulgence of the meeting for a moment. Mr. Norcross just spoke about the expense. I believe that I can personally guarantee that if the members outside of this District know, or rather the prospective members outside of this District know, that they are really going to be a part of this Society, that we can get new membership around the Twin Cities to the extent of thirty-five members, and that is $700. I do not believe it is going to cost that much.

CLEMENS HERSCHEL, PAST-PRESIDENT, AM. SOC. C. E.—Mr. President, I want to second what Mr. Norcross has said. As a matter of hearsay, I will say to you that this subject of a new Constitution has been to my knowledge before this Society for more than five years. We have spent a great deal of time on it. The members have done a great deal of work on it. Is it not reasonable, is it not sensible, is it not the only way to do business, when you have a new Constitution, which, in the nature of human things cannot be put before you as perfect, that you give it a trial to see how it works? The only thing in my mind to be done in this case is to take that whole Group II and lay it on the table.

MR. CHESTER.—Mr. President, while I have the utmost sympathy for all that Mr. Norcross has said, and all that our Past-President, Mr. Herschel, has said with respect to this Constitution, those of you who were present at Houston, when this matter was being adopted and some slight amendments were brought up there, will remember that Mr. Norcross and the remainder of the Committee used the one argument that if we started to amend this Constitution then in the slightest way it would probably defeat the whole thing. We were all of accord, as was said here yesterday, or last night at the Officers' meeting, that this Constitution, we all recognized, was better than the old one, and the thing to do was to get it into operation, and then we could make slight amendments, and cause it to function in a way that would be satisfactory to the majority of the Society. Mr. Norcross, in addressing you

here to-day, does not say a word about the fact that this new Constitution omitted to assess members, non-resident of the United States, or some group was omitted altogether, and that this amendment is absolutely necessary to restore the funds of this Society. If one amendment is necessary, and that one certainly is, why should not the remainder be considered? Why, if the Committee made one mistake, and a gross one, might it not have made others? Is it not the function of this meeting and the right of every member to discuss or to propose other amendments when they think them necessary?

As regards the experience with Sections, I represent Pittsburgh, and our position is much the same as that stated by Mr. Walker who comes from the Twin Cities; and as regards the American Society of Mechanical Engineers, I am on the Executive Committee of the Pittsburgh Section of that Society. They are having no trouble such as the Utica men report, but they only need something to interest them. They only need to be made feel that they are part and parcel of the whole. I hold no brief for any one of these amendments. I do believe in our right to amend that Constitution. I believe it is right to make the first amendment and get dues assessed on the members who were omitted. That goes without argument; but if that is right, there certainly must be some others that we have a right to discuss and a right to send out to ballot; and as has been expressed here, the General Headquarters of this Society being in the City of New York, in District No. 1, it is apparent that if the interests of District No. 1 are served at the expense of the remainder of the country, it is likely to have an adverse or contrary effect on the other districts and on the far-away members. So that I feel that the sentiment of this meeting, held here in the heart of District No. 1, is not representative of the majority of the membership. To express the opinion of this meeting is all right, but we must not strangle the getting out of these amendments as expressed by Past-President Herschel.

De F. A. Wheelock, M. Am. Soc. C. E.—I do not desire to take up any time except to say this, we are a deliberative body composed of a large membership, in which every member should have a voice in its deliberation and in its action. I do not think there is any criticism of the Committee that prepared this new Constitution. It is an improvement. We all adopted it. One is to blame as much as another. My point is this, I cannot see the source of the objection to sending out these amendments to letter-ballot among the membership, a very small portion of which, among the New York membership, is represented in this body to-day. I believe we are a democratic body, and the majority should rule. If you bought a new car, in which the manufacturer had put his best efforts and his best materials in order to give you a perfect car, you would not run that for a week or for a month or a year to give it a trial; if you found something wrong with it, you would get him to correct it at once. If you have a small blow-out somewhere in this Constitution, is it not proper to submit it to the membership for their consideration by letter-ballot in order to correct it?

Mr. Norcross.—We corrected the blow-out in the first group of amendments.

THE PRESIDENT.—It is moved and seconded that this group be sent out to letter-ballot with the unfavorable recommendation of this gathering. All those in favor of the motion give their assent by saying "aye"; contrary, "no". The "ayes" appear to have it. The motion is carried.

THE ACTING SECRETARY.—"Amend Section 4, by striking out the word 'President' in the first line of the second paragraph so that the paragraph will read as follows:

"In the event of a tie vote for nominee for Vice-President or Director the names of the persons receiving such tie vote shall be placed on the ticket as 'Official Nominees'."

MR. HUMPHREY.—I move that it be sent out to letter-ballot.

(Motion duly seconded.)

MR. RIGHTS.—Mr. President, I would like to amend that, with the adverse recommendation of this meeting.

(Motion duly seconded.)

THE PRESIDENT.—The motion is that this amendment be sent out to letter-ballot, with the adverse vote of this meeting. Is there any discussion? All those in favor of the amendment will give their assent by saying "aye". The "ayes" appear to have it. Unless a division is called for, I will decide that the "ayes" are in the majority. We will now vote on the original question as amended. Those in favor will give their assent by saying "aye"; contrary, "no". The "ayes" appear to have it. The "ayes" have it. We will proceed with the reading of the amendments.

THE ACTING SECRETARY.—"Add after Section 4 a new Section to read as follows:

"5.—The hereinafter provided Annual Conference of Representatives of Local Sections at which the representatives shall have voting power in proportion to the respective memberships of the Local Sections represented, shall nominate one or more candidates to fill the office of President to be elected at the next annual election; the written acceptance of each candidate must be obtained prior to his nomination.

"A list of said nominations, together with the list of the nominations for Directors by the several geographical districts, and of the nominations for Vice-Presidents by the several Zones, certified by the Chairman and the Secretary of the said Conference, shall be presented to the Board of Direction not later than the fifteenth day of September.

"The nominations thus made to be known as the 'Official Nominations' shall be such as to provide, with the officers holding over, the officers provided for in Article V."

MR. HUMPHREY.—I move that this be sent out to letter-ballot.

(Motion duly seconded.)

MR. RIGHTS.—I would like to amend that, with the adverse recommendation of this meeting.

(Motion duly seconded.)

THE PRESIDENT.—Are you ready for the question? The vote will be on the amendment that is to be sent out with the adverse recommendation of this meeting. Any discussion? All those in favor of the amendment will give their assent by saying "aye"; contrary, "no". The "ayes" appear to have it.

Unless a division is called for, I will decide that the "ayes" have it. The amendment is carried. The vote will now be on the motion as amended, that it be sent out to letter-ballot with the adverse recommendation of this meeting. All those in favor of the motion will give their assent by saying "aye"; contrary, "no". The "ayes" have it. The motion is carried.

THE ACTING SECRETARY.—"Re-number Sections 5, 7, 8, 9, and 10, and amend Section 6 to read Section 7, and strike out in the second paragraph the words 'showing also thereon the results of the "second ballot"'."

MR. HUMPHREY.—I move that it be sent out to letter-ballot.

(Motion duly seconded.)

THE PRESIDENT.—It is moved and seconded—

MR. RIGHTS.—I would like to amend again, with the adverse recommendation of this meeting.

THE PRESIDENT.—The vote will be on the amendment. All those in favor of the motion being sent out with the adverse recommendation will give their assent by saying, "aye"; contrary, "no". The "ayes" appear to have it. Unless there is a division called for, I will decided that the "ayes" have carried it. The vote will now be on the original motion as amended. All those in favor will give their assent by saying "aye"; contrary, "no"; the "ayes" have carried it. We will now proceed with the next amendment.

THE ACTING SECRETARY.—"Amend Article VIII.—Meetings: Add a new section to read as follows:

"5.—There shall be held, during the month of July or August, an Annual Conference of Representatives from the Local Sections to consider the welfare of the Society and its members and to report thereon to the Board of Direction; one representative thereto from each section shall be allowed traveling expenses within Continental United States on a mileage basis.

"The Annual Conference of Representatives of Local Sections shall elect from among its members a Chairman and a Secretary to serve for one year beginning on the first day of the following November. At said Annual Conference a majority of the representatives shall constitute a quorum; if at said Annual Conference a quorum is not present, then such representatives as are present shall call an adjourned meeting."

MR. HUMPHREY.—I move that that be sent out to letter-ballot.

GARDNER S. WILLIAMS, M. AM. SOC. C. E.—I second the motion.

THE PRESIDENT.—It is moved and seconded—

MR. RIGHTS.—I move an amendment again, with the adverse recommendation of this meeting.

(Motion duly seconded.)

THE PRESIDENT.—Any discussion on the amendment? If not, we will vote on the amendment. All those in favor will give their assent by saying "aye"; contrary, "no". The Chair believes that the "ayes" are in the majority. Unless there is a division called for, he will so decide. There being no division called for, it is decided in the affirmative. The vote will now be on the original motion as amended. All those in favor will give their assent by saying, "aye"; contrary, "no". The motion is carried. The "ayes" are in the majority.

THE ACTING SECRETARY.—"Amend Article IX.—Local Sections: Strike out the first paragraph and substitute the following:

"There shall be established in each geographical district of the Society one or more Local Sections. These Sections shall have powers and act under such rules and regulations as the Board of Direction may prescribe.

"Each member of the Society shall identify himself with a Local Section in the district in which he resides, or, in default of voluntary action, shall be assigned to the most suitable section in said district by the Board of Direction."

"Strike out of the second paragraph the word 'may' in the first line and substitute the word 'shall'."

MR. HUMPHREY.—I move that that be sent out to letter-ballot.

MR. WILLIAMS.—I second it.

MR. RIGHTS.—I would like again to amend, with the adverse recommendation of this meeting.

MR. HERSCHEL.—I second it.

THE PRESIDENT.—The vote will be on the amendment. All those in favor will give their assent by saying "aye"; contrary, "no". The "ayes" appear to be in the majority; unless there is a division called for, the Chair will so decide.

MR. HUMPHREY.—On this motion I would like to have a division.

THE PRESIDENT.—Those in favor of the amendment will please hold up their hands. All those opposed, hold up their hands; 207 in the affirmative and 36 in the negative.

MR. WALKER.—Just as a matter of interest—

THE PRESIDENT.—We have another motion before the house. The vote will now be taken on the motion as amended. All those in favor will give their assent by saying "aye"; contrary, "no". The original motion as amended is carried.

Mr. Walker, I understand that is the last amendment. Have you anything you wish to say?

MR. WALKER.—Just as a matter of interest, I would like to know how many in the audience voting reside outside of District No. 1, and how many in District No. 1.

MR. HUMPHREY.—I would suggest that a show of hands of those outside District No. 1 would be sufficient.

THE PRESIDENT.—The registration will show the number of visitors and the number of those residing in New York.

MR. WALKER.—The point I wish to make is this, that the majority of the members reside outside of the First District, and yet of those present at this meeting probably three-quarters are from the First District.

MR. HERSCHEL.—Mr. President, I have the utmost sympathy and have had, ever since I have been a member of this Society, and that is 53 years, with the interests of members outside of the First District. I, myself, have been a member of the First District only in the last 30 years.

Now, as sometimes happens, some of the thoughts that I wanted to put into my previous remarks came to me after I had sat down, and one of those is that the trend of thought and prospective action of this Society is all in the direction of building up the Local Sections. I ask my friend from the

Twin Cities to put that "in his pipe and smoke it" and report it when he gets home. Looking to the future of the Society, there has been nothing to which the Board of Direction has given more thought than that very point; and every man here who does not belong to District No. 1 may go home feeling assured that under the new Constitution, which allows and was built up for the purpose of bettering the condition of the Local Sections, and increasing their numbers, they will have the whole attention of the Board of Direction in the future. That is the trend of thought now, and I have not the slightest doubt that it will so continue.

MERRITT H. SMITH, M. AM. SOC. C. E.—Mr. President and Gentlemen, as one who voted in favor of the amendment and in favor of the motion as amended, I want to second the motion of the gentleman from Minneapolis, to take a vote as to how many are here from District No. 1, and those who are here from a distance. I can see no reason why that is not good information to send out to the membership of this Society, no matter where they live.

THE PRESIDENT.—That will be all shown by the registration, and will go out in the *Proceedings*.

JOHN F. O'ROURKE, M. AM. SOC. C. E.—I do not think it will show the people who are not voting. The registration will not show whether you voted or not.

MR. SMITH.—If I may be permitted, I understand that Mr. Walker from Minneapolis made a motion—

THE PRESIDENT.—He made no motion.

MR. WALKER.—Only a suggestion, I will, however, make a motion.

MR. SMITH.—And I will second it.

THE PRESIDENT.—There is no motion at present before the house. Mr. Walker has not made a motion.

MR. EDDY.—I voted for the amendment as an amendment. I am not from District No. 1. I think that it is courteous that we have a division here to show how many members are from District No. 1 and how many are from the outside, and I make that motion.

MR. SMITH.—And I second it, Mr. President.

THE PRESIDENT.—The motion is that a canvass be made to determine how many members in this room are from District No. 1, by a show of hands.

A MEMBER.—And how many from other districts.

THE PRESIDENT.—Are you ready for the question? All those in favor give their assent by saying, "aye"; contrary, "no". The motion is carried. Will those from District No. 1 hold up their hands, and we will have a canvass made.

All those outside the District will hold up their hands, and we will make another count. The count shows 223 from District No. 1 and 150 from outside. Gentlemen, we will now proceed with the business of the meeting, and the Acting Secretary will make an announcement.

THE ACTING SECRETARY.—The President has requested that this announcement, which has been presented to him, be made: The Presidents and Chairmen of the various Local Sections are invited to attend an informal meeting at 9 o'clock to-morrow morning. No place is designated. I assume that the Past-Presidents' Room will be satisfactory.

MR. TALBOT.—The Past-Presidents' Room has been assigned at 10 o'clock to another Committee.

THE PRESIDENT.—That Committee meets at 9 o'clock and will probably be through by that time. If not, other arrangements will be made.

THE ACTING SECRETARY.—In accordance with the usual custom, I will announce the election and transfer of members by the Board of Direction at its meetings of January 16th and 20th, 1922, as follows:

AS MEMBERS

THEODORE BLOECHER, JR., Baltimore, Md.
ARTHUR NORBERT BLUM, Philadelphia, Pa.
JAMES BOLTON, Richmond, Va.
ROY WILLIAM BURPEE, Pittsburgh, Pa.
WILLIAM HECTOR BUSH, St. Louis, Mo.
EUGENE COUCH, Dallas, Tex.
WILLIAM SLADE EARLE, Tallahassee, Fla.
TRAUGOTT FRANCIS KELLER, New York City
CHARLES CYRUS KERNS, Kansas City, Mo.
ROBERT GRAHAM LOSE, Atlanta, Ga.
ALVA J. SMITH, Emporia, Kans.

AS ASSOCIATE MEMBERS

WALTER FRANCIS ADAMS, Berkeley, Calif.
WILLIAM GEORGE ALEXANDER ADAMS, Inkster, Mich.
JOHN DAVID ANDERSON, New York City
FREDERICK AMERMAN DALE, Port Washington, N. Y.
ROY HAROLD DAVIS, Chicago, Ill.
LESLIE MORTIMER DENNIS, Red Bank, N. J.
FREDERICK WILLIAM DOUGLAS, New York City
FRED GEORGE FELLOWS, Denver, Colo.
ALBERT EDWIN FIRMIN, Comanche, Tex.
ROBERT RAYMOND FISHER, Fresno, Cal.
HAROLD ROBERT LESLIE FOX, Kingston, Jamaica
ISIDRO GABINO JÁUREGUI, Santiago de Cuba, Cuba
JAMES KEARNEY, New York City
SAMUEL CLAIR MCKEE, Toledo, Ohio
WARNER JOHN O'LEARY, San Francisco, Calif.
GEORGE EDWIN OLIVER, Onawa, Iowa
MILAN KENTON ORR, Harrison, Ark.
JOSEPH GUY ROLLINS, Breckenridge, Tex.
CHARLES MILLICHAMP ROMANOWITZ, Alameda, Calif.
WALTER CLAIR RUSSELL, Flint, Mich.
OTTO STEPHEN SCHLICH, New York City
HARRY LAWRENCE SHOEMAKER, Elizabeth, N. J.
JOHN PERRY SHUMAKER, Lima, Ohio
EARL MILTON SPENCER, Topeka, Kans.
JOHN JOSEPH SWEENEY, Philadelphia, Pa.

FRANK FREDERICK TRIERWEILER, Portland, Ore.
FRITZ LEROY WASHBURN, Decatur, Ill.
LAURENCE EDWIN WHITAKER, Flint, Mich.
WILLIAM GUY WILLIAMS, New York City
PAUL EUGENE WYLIE, Des Moines, Iowa

AS AFFILIATES

DWIGHT ALLEN GRANT, Oil City, Pa.

AS JUNIORS

CHARLES FRANCIS BALPH, Ponca City, Okla.
HARRISON BLANKSTEIN, New York City
HERBERT CONRAD DESTAEBLER, St. Louis, Mo.
KENNETH LOUIS GREEMAN, Indianapolis, Ind.
RAY ELLIOTT MACKENZIE, St. Ignatius, Mont.
WILLIAM EDWARD MARSHALL, Ambridge, Pa.
IRVING HOLMAN PARKER, Montreal, Que., Canada
JOHN MACKLEM PERKINS, Langhorne, Pa.
WALTER HARRISON ROBERTSON, East Orange, N. J.

FROM ASSOCIATE MEMBER TO MEMBER

EUGENE DUSTON BARSTOW, Akron, Ohio
ROBERT WESLEY BRIGGS, Yonkers, N. Y.
ROBERT LEE BURNEY, San Antonio, Tex.
HARRY CADY BYRNES, Pueblo, Colo.
JOHN HIRST CATON, 3D, Santo Domingo, Dominican Republic
ROBERT ANDREW CAUGHEY, Ames, Iowa
EMERSON LAWRENCE CHANDLER, Dayton, Ohio
PERLEY EUGENE CONNER, Winnetka, Ill.
GEORGE WASHINGTON CORRIGAN, Pasadena, Calif.
WALDO SCARLETTE COULTER, Brooklyn, N. Y.
FRANK OLIVER DUFOUR, Easton, Pa.
HAROLD MANSFIELD EDDY, Lakehurst, N. J.
WALTER LINDER FOSTER, Ames, Iowa
JOSEPH HARRINGTON GANDOLFO, Trenton, N. J.
WARD HALL, San Francisco, Calif.
JOHN THOMAS HOPKINS, New Brunswick, N. J.
LOUIS RICHARD HAWSON, La Grange, Ill.
HENRY LOUIS JACQUES, San Fernando, Calif.
JOSEPH WARREN JONES, Dallas, Tex.
PERCY FRANCIS JONES, Modesto, Calif.
WILLIAM KELLY, Washington, D. C.
KARL RAYMOND KENNISON, Boston, Mass.
WILLIAM ARTHUR LAFLER, Rochester, N. Y.
CHARLES WALTER LAWRENCE, Los Angeles, Calif.
HARRY FONTAINE MCFARLAND, JR., Wichita Falls, Tex.
ROGER LEROY MORRISON, Birmingham, Ala.

GEORGE ALEXANDER NOREN, New York City
STEPHEN HENLEY NOYES, Philadelphia, Pa.
CHARLES WESLEY PETIT, Ventura, Calif.
HERBERT FULWILER ROBINSON, Albuquerque, N. Mex.
RALPH EARLE ROHN, Canton, Ohio
WILLIS APPLEFORD SLATER, Washington, D. C.
CLAIBORNE ELLIS SMITH, East San Diego, Calif.
WALTER DORR SMITH, Los Angeles, Calif.
JOHN RODGERS SPELMAN, Rockville Centre, N. Y.
GUSTAVUS WILLIAM THOMPSON, Syracuse, N. Y.
ERNEST JUDSON WAUGH, Riverside, Calif.
ELLWOOD COGGESHALL WILDER, Honolulu, Hawaii

FROM AFFILIATE TO MEMBER

EDWARD CARTWRIGHT CONSTANCE, Kansas City, Mo.

FROM JUNIOR TO MEMBER

SOLOMON JACOB HARWI, Bayonne, N. J.

FROM JUNIOR TO ASSOCIATE MEMBER

BJARNE BERGSLAND ANDERSON, New York City
RAYMOND FIELDING BRALY, Spring Lake, N. J.
ROBERT MORRIS COPELAND, Washington, D. C.
WILLIAM MORAGNE HUSSON, New York City
ALBERTIS MONTGOMERY, Fort Sam Houston, Tex.
HENRY MITCHEL WEITZNER, New York City

I also announce the following deaths:

ANDERSON HARVEY TYSON, of New York City, elected Member, October 2d, 1889; died January 12th, 1922.

DEBERNIERE WHITAKER, of Santiago de Cuba, Cuba, elected Member, October 1st, 1912; died December 25th, 1921.

HAROLD INGERSOLL BELL, of Portland, Me., elected Associate Member, August 31st, 1915; died December 28th, 1921.

ANSON MORSE BLENUS, of North Pelham, N. Y., elected Associate Member, July 6th, 1920; died January 5th, 1922.

CLIFFORD MARSHALL KING, of Cleveland, Ohio, elected Junior, March 6th, 1906; Associate Member, July 1st, 1909; died January 2d, 1922.

ABRAHAM JOHN RUTH, of Tampico, Mexico, elected Associate Member, March 4th, 1913; died November 3d, 1921.

EDMUND ABIEL THORNTON, of Ray, Ariz., elected Associate Member, November 4th, 1914; died January 9th, 1922.

THE PRESIDENT.—At this time are there any reports from the Board of Direction? There is none in the hands of the Acting Secretary.

THE ACTING SECRETARY.—I wish to announce that the organization meeting of the new Board of Direction will be held in the Board Room at 4 P. M., this afternoon. Your attention is also directed to a new type of "name plate", so to speak, which is relatively expensive. The plan is that at the last

meeting which you attend, you will leave the badge in a receptacle at the door, so that it may be used again year after year. I hope you will co-operate in carrying out this plan. There are no further announcements.

THE PRESIDENT.—New business is in order. Have you any new business?

THE ACTING SECRETARY.—No.

THE PRESIDENT.—Has any member any new business? There being no new business the report of the Tellers is in order, the report of the canvass for officers, William G. Grove, Chairman of the Committee.

WILLIAM G. GROVE, M. AM. SOC. C. E.—The report of the Tellers is as follows:

"33 WEST 39TH STREET, NEW YORK, N. Y.,
"January 18th, 1922.

"TO THE SIXTY-NINTH ANNUAL MEETING,
AMERICAN SOCIETY OF CIVIL ENGINEERS:

"The Tellers appointed to canvass the ballots for Officers of the Society for 1922, report as follows:

"Total number of ballots received		2152
"Deduct		
"Ballots from members in arrears of dues	9	
" with lettered instead of written signature	4	
" unsigned	23	
"Total number not entitled to vote		36
"Ballots canvassed		2116
"For President:		
JOHN RIPLEY FREEMAN		2097
Scattering		9
"For Vice-Presidents:		
CARL EWALD GRUNSKY		2081
ROBERT RIDGWAY		2069
Scattering		11
"For Directors:		
District No. 1 — CLIFFORD M. HOLLAND		2034
District No. 1 — JOSEPH JOHNSON YATES		2042
District No. 1 — Scattering		6
District No. 2 — FRANK EDWARD WINSOR		2029
District No. 2 — Scattering		3
District No. 6 — JOHN NEEDELS CHESTER		2016
District No. 6 — Scattering		13
District No. 8 — ARTHUR JAMES DYER		2023
District No. 8 — Scattering		9
District No. 13 — WALTER LEROY HUBER		2036
District No. 13 — Scattering		3

"W. G. GROVE, *Chairman,*

"C. S. BILYEU,
A. W. CARPENTER,
RALPH H. CHAMBERS,
C. E. CONOVER,
R. DE CHARMS,
MYRON E. FULLER,
"R. R. GRAHAM,
H. P. HAMMOND,
GEORGE PERRINE,
F. W. PERRY,
D. H. SAWYER,
GEORGE L. SAWYER,
Tellers."

(The President announced the election of the Members having the highest votes for the respective offices.)

THE PRESIDENT.—I will appoint Past-Presidents Davis and Talbot to escort the newly elected President to the chair.

JOHN R. FREEMAN, PRESIDENT, AM. SOC. C. E.—Mr. President and Fellow Members: It goes without saying that I deeply appreciate this high honor. I have been a member in one grade and another for about forty years. I began as a Junior, and I think the greatest benefit I received from this Society was during my days as a Junior, from the inspiration I got from the older men. I approach this office with great humility, after I recall the Past-Presidents whom I have known, and I realize that my own powers are relatively limited. I am only one member of the Board of Direction.

I wish you could all have been present last evening at the meeting of the past and present officers of this Society, or that you could at least have heard the general tenor of the remarks. There was not a discordant note of any kind. All the speech-making was directed toward the future progress of the Society, and it all centered around three main topics: How can the Society be made of greater service to the distant members; how can we advance the Society by Local Sections; and, what can be done for the benefit of Student Chapters and the Juniors?

I have been profoundly impressed this morning with the possibilities of usefulness in the American Society of Civil Engineers, as I have listened to the reports of the activities during the past year. It seems to me that the titles of more than a dozen Committee Reports that were placed before you should satisfy the most progressive members; that the most conservative member will not be afraid of any action that will injure the fair fame of this Society, while its destiny is looked after by the present membership of the Board of Direction.

For myself and for my fellow members of the Board of Direction, I can assure you that we all have our faces turned toward the sunrise and that we will serve you to the very best of our ability. I thank you.

The Acting Secretary has an announcement to make.

THE ACTING SECRETARY.—Mr. President, a very extensive effort has been made to secure reduced fare for the members who are obliged to come from a long distance. Those who have Certificates are requested to be sure to have them validated before going to the luncheon at the McGraw-Hill Building. The members are also reminded that immediately on the adjournment of this meeting, they will find buses ready on Thirty-ninth Street to transport them as quickly as possible to the McGraw-Hill Building. I thank you.

THE PRESIDENT.—Is there anything further to come before this meeting? If not, I will declare the meeting adjourned.

January 19th, 1922.—The meeting was called to order at 9.30 A. M., by President John R. Freeman; Elbert M. Chandler, Acting Secretary; and present, also, 105 members and guests.

Owing to a meeting of the Board of Direction, President Freeman placed the meeting in charge of Vice-President C. E. Grunsky.

The subject for this meeting was "Water Transportation",* discussion on which was opened by R. H. M. Robinson, Acting President, United American Lines, Incorporated, New York City. Mr. Robinson was followed by Winthrop L. Marvin, Vice-President and General Manager, American Steamship Owners' Association, New York City, who spoke briefly relative to the "American Merchant Marine." This subject was also discussed, from the standpoint of the economist, by Dr. Emory R. Johnson, Dean, Wharton School of Finance and Economy, University of Pennsylvania, Philadelphia, Pa. Samuel O. Dunn, Editor of *Railway Age,* Chicago, Ill., who followed Dr. Johnson, discussed "Water Transportation in Its Relation to the Railways".

The addresses were followed by discussion of the general subject by Messrs. J. E. Willoughby, J. C. Trautwine, Jr., Gardner S. Williams, Augustus Smith, W. F. Rittman, C. C. Vermeule, and Benjamin F. Groat.

Adjourned at 12 M., to meet again at 2.10 P. M.

January 19th, 1922.—The meeting was called to order at 2.10 P. M.; Past-President F. S. Curtis in the chair; and present, also, 277 members and guests.

The afternoon session was devoted to a discussion of "Railroad Transportation".† The first speaker was Howard Elliott, Affiliate, Am. Soc. C. E., Chairman, Executive Committee, Northern Pacific Railway Company, New York City. Mr. Elliott was followed by William N. Doak, Vice-President, Brotherhood of Railroad Trainmen, Washington, D. C., and F. A. Molitor, M. Am. Soc. C. E., Chairman, Board of Economics and Engineering, National Association of Owners' of Railroad Securities, New York City.

Adjourned at 4.15 P. M., to meet again at 9.40 A. M., on January 20th, 1922.

January 19th, 1922.—The meeting was called to order at 8.30 P. M.; President John R. Freeman in the chair; and present, also, about 1 000 members and guests.

President Freeman introduced the speaker of the evening, Mr. Frank A. Vanderlip, of New York City, who addressed the meeting on "World Activities and Their Effect Upon the Engineer".‡

At the conclusion of his interesting address, Mr. Vanderlip was tendered a rising vote of thanks.

January 20th, 1922.—The meeting was called to order at 9.40 A. M.; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, 123 members and guests.

This session, the first of three at which "Highway Transportation" was discussed, was devoted to "Inspection of Highway Work".§ The first speaker, Thomas H. MacDonald, Director, U. S. Bureau of Public Roads, Washington, D. C., analyzed briefly the status of highway improvement as it is to-day.

(Past-President Clemens Herschel took the chair.)

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* See Papers and Discussions, p. 265.

† *Ibid,* p. 287.

‡ See p. 140.

§ See Papers and Discussions, p. 318.

The next speaker, H. E. Hilts, Assoc. M. Am. Soc. C. E., Principal Assistant Engineer, Pennsylvania State Highway Department, Harrisburg, Pa., described briefly the highway work being done in Pennsylvania. Mr. Hilts was followed by William G. B. Thompson, Assoc. M. Am. Soc. C. E., formerly State Highway Engineer of New Jersey, Trenton, N. J., whose subject was "Highway Inspection".

The addresses were followed by a discussion of the general subject by Messrs. T. Hugh Boorman, Samuel Whinery, John C. Trautwine, Jr., E. W. Stern, Henry Goldmark, M. S. Ketchum, and H. W. Brown.

Adjourned at 12.30 P. M., to meet again at 2.15 P. M.

January 20th, 1922.—The meeting was called to order at 2.15 P. M.; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, 154 members and guests.

In continuation of the discussion on "Highway Transportation", the afternoon session was devoted to the question of "Financing and Bonding for Highway Construction".* The discussion was opened by John N. Cole, Commissioner, State Department of Public Works, Boston, Mass., who was followed by the Hon. Francis M. Hugo, formerly Secretary of State of New York, who presented a paper on the subject by E. A. St. John, Vice-President, National Surety Company, New York City. Mr. Hugo was followed by Edward C. Lunt, Vice-President, Fidelity and Casualty Company, New York City, who discussed the "Underwriting of Highway Bonds", and Harry Meixell, Jr., Secretary, Motor Vehicle Conference Committee, New York City. The subject was also discussed by Frederick Stuart Greene, M. Am. Soc. C. E., formerly State Commissioner of Highways of New York City, and Herbert S. Sisson, State Commissioner of Highways, Albany, N. Y.

Adjourned at 4.25 P. M., to meet again at 8.15 P. M.

January 20th, 1922.—The meeting was called to order at 8.15 P. M.; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, 59 members and guests.

The evening session was devoted to a continuation of the discussion on "Highway Transportation". The subjects discussed were "Administration", "Relation of Highway to Other Transportation Systems", and "Motor Vehicle Control".†

In the absence of Robert S. Parsons, M. Am. Soc. C. E., General Manager, Erie Railroad Company, New York City, the Acting Secretary presented his paper on "The Motor Truck as an Asset to Railroad Operation". G. Wythe Munford, Inspector, Commission of Motor Vehicles, Baltimore, Md., addressed the meeting on "The Control of Motor Vehicle Traffic as We Handle It in Maryland", and the question of "State Regulation of Motor Transportation" was discussed by Mr. Harry Meixell, Jr.

Adjourned.

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* See Papers and Discussions, p. 236.

† *Ibid*, p. 345.

February 1st, 1922.—The meeting was called to order at 8:20 P. M.; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, 135 members and guests.

The minutes of the meetings of January 4th and 5th, 1922, were approved as printed in *Proceedings* for January, 1922.

The Acting Secretary announced the following deaths:

HARRY KENT SELTZER, of Kansas City, Mo., elected Junior, February 4th, 1896; Associate Member, January 2d, 1901; Member, April 3d, 1906; died December 30th, 1921.

CHARLES ALBERT LORING WRIGHT, of Springfield, Mass., elected Member, October 10th, 1916; died August 17th, 1921.

The meeting was devoted to a lecture on "Past and Predicted Growth of Power Demand in New York State" by John P. Hogan, M. Am. Soc. C. E., who illustrated his remarks with lantern slides. The subject was also discussed by President Freeman and Messrs. T. Kennard Thomson and H. de B. Parsons.

Adjourned.

EXCURSIONS AND ENTERTAINMENTS AT THE SIXTY-NINTH ANNUAL MEETING

Wednesday, January 18th, 1922.—At the close of the Business Meeting of the Society at 1 P. M., about 600 members were taken in buses to the plant of the McGraw-Hill Publishing Company, at Tenth Avenue and 36th Street. Through the courtesy of E. J. Mehren, Affiliate, Am. Soc. C. E., Editor, *Engineering News-Record,* the members were guests at a luncheon served in the plant. After the luncheon, the visitors were divided into small parties and conducted on an inspection tour of the establishment which lasted all afternoon. A pamphlet was distributed in which was described the points of interest. Special exhibits had been arranged, and a most interesting and instructive visit was enjoyed by the members.

At 7.30 P. M., a Dinner Dance and Reception in honor of the President and the newly elected Honorary Members of the Society, was held in the Hotel Pennsylvania, at which there were present about 400 members and guests. The Dinner Dance was an innovation, but proved to be unusually enjoyable.

Thursday, January 19th, 1922.—In accordance with plans made by the Local Committee on Arrangements, the members were offered two trips to places of interest in the city.

Trip No. 1.—From 9.00 A. M. until noon, guides conducted members in small groups to the New York Stock Exchange. About 550 members took advantage of this interesting excursion and were able to view the Exchange in operation. After leaving the Exchange the parties were conducted to the foundation work of the new $15 000 000 Federal Reserve Bank Building at Nassau and Liberty Streets. At 1.00 P. M., luncheon was served in the Engineering Societies Building.

Trip No. 2.—At 2.00 P. M., buses conducted about 400 members and guests to the Hell Gate Power Station of the United Electric Light and Power Company at East River and 135th Street. This plant, when completed, will have an ultimate capacity of 240 000 kw.

At 8.30 P. M., in the Auditorium of the Engineering Societies Building, Mr. Frank A. Vanderlip, formerly President of the National City Bank of New York City, delivered an interesting address on "World Activities and Their Effect Upon the Engineer". About 1 000 members and guests were present, and following the address an informal Smoker and social was held on the Fifth Floor.

The following list contains the names of 953 members of various grades who registered as being in attendance at the Annual Meeting. The list is probably incomplete, as some members failed to register, and it does not contain the names of any of the guests of the Society or of individual members. It is estimated that the total attendance was about 1 200.

Attendance at Annual Meeting

Abbott, H.....New York City
Ackerman, A. P.....New York City
Adams, E. G.....New York City
Adey, W. H.....Cohoes, N. Y.

Aiken, W. A.....Mamaroneck, N. Y.
Aikenhead, J. R...Rutherford, N. J.
Albertson, J. J.....Magnolia, N. J.
Alexander, A.....New York City
Alderson, A. B..West Hartford, Conn.
Allee, D. A.....Schenectady, N. Y.
Allen, E. Y.....Philadelphia, Pa.
Allen, F. W.....Mt. Vernon, N. Y.
Allen, H. D.....Newark, N. J.
Allen, K.....New York City
Alvord, J. W.....Chicago, Ill.
Ammann, O. H.....New York City
Anderberg, E.....New York City
Anderson, B. B.....New York City
Anderson, G. G...Los Angeles, Calif.
Andrews, H.....Albany, N. Y.
Archer, A. R.....New York City
Armstrong, R. W....Brooklyn, N. Y.
Ash, W. J.....Newark, N. J.
Atkinson, A...New Brunswick, N. J.
Auryansen, F.....Jamaica, N. Y.
Austin, H. S.....Elizabeth, N. J.
Austin, W. E.....New York City
Aylett, P.....Hollis, N. Y.

Babcock, W. S.....New York City
Baird, H. C.....New York City
Baker, F. A.....Allenhurst, N. J.
Baker, I. O.....Urbana, Ill.
Baldwin, A. S.....Chicago, Ill.
Baldwin, W. J.....New York City
Ball, L. A.....New York City
Bamford, W. B.....Belmar, N. J.
Banta, R. V.....New York City
Baptiste, E. E.....Jersey City, N. J.
Barbour, F. A.....Boston, Mass.
Barck, W. F.....Hoboken, N. J.
Barnes, F. E.....New York City
Barnes, O. F.....Jersey City, N. J.
Barnes, T. H.....New York City
Barnes, W. T.....Wilkes-Barre, Pa.
Barney, P. C.....New York City
Barney, S. E.....New Haven, Conn.
Bassett, W. A.....New York City
Batchelder, B. F.....Boonton, N. J.
Bayles, G. H...Morgantown, W. Va.
Beam, C. E.....New York City
Bean, E. D.....Schenectady, N. Y.
Beer, F. M.....Brooklyn, N. Y.
Beggs, G. E.....Princeton, N. J.
Begien, R. N.....Cincinnati, Ohio
Belcher, W. E.....New York City
Belden, E. T.....Englewood, N. J.
Belknap, J. M.....New York City
Bell, J. C.....Elmhurst, N. Y.
Bellows, O. F.....New York City
Belzner, T.....Brooklyn, N. Y.
Benedict, F. N...East Orange, N. J.
Bennett, H.....New York City
Bennett, J. W. F.....New York City
Bensel, J. A.....New York City
Berger, J.....New York City
Berry, H. C.....Philadelphia, Pa.
Besselievre, E. B.....New York City
Beswick, J. E...New Brighton, N. Y.
Bettes, C. R...Far Rockaway, N. Y.
Beugler, E. J.....New York City
Bevan, L. J.....New York City
Bilyeu, C. S.....New York City
Binger, W. D.....New York City
Bissell, C. T.....New York City
Blair, A.....Millington, N. J.
Blakeslee, C.....New Haven, Conn.
Blanchard, R. K.....New York City
Blech, E. S.....New Rochelle, N. Y.
Boardman, C. S.....Buffalo, N. Y.
Boardman, H. E.....New York City
Boetzkes, H. W.....New York City
Bogardus, J. S....Mt. Vernon, Ohio
Bogart, J. L.....Glen Head, N. Y.
Bogert, C. L.....Teaneck, N. J.
Boland, C. J.....Troy, N. Y.
Boller, A. P., Jr...East Orange, N. J.
Bolmer, M. T..Richmond Hill, N. Y.
Bond, E. A.....Castleton, Pa.
Bond, G. M.....Hartford, Conn.
Boniface, A.....Scarsdale, N. Y.
Bontecou, D.....Mamaroneck, N. Y.
Boorman, K. M.....New York City
Booth, G. W.....New York City
Borough, E. W.....New York City
Boucher, W. J.....New York City
Boyden, H. C.....Chicago, Ill.
Brackenridge, J. C...New York City

Bradley, F. E.....New York City
Braunworth, P. L.....Newark, N. J.
Breed, C. B.....Boston, Mass.
Breitzke, C. F.....Boonton, N. J.
Brennan, E. M.....Albany, N. Y.
Brennan, J. L.....New York City
Breuchaud, J.....New York City
Briggs, J. A.....New York City
Briggs, R. W.....Yonkers, N. Y.
Brodie, O. L.....New York City
Brosius, A. M.....Baltimore, Md.
Brown, A. T.....New York City
Brown, B. L.....St. Louis, Mo.
Brown, H. W.....Boston, Mass.
Brown, L. F.....Brooklyn, N. Y.
Brown, S. D.....New York City
Brown, T. E.....New York City
Brumley, D. J.....Chicago, Ill.
Brush, W. W.....New York City
Bryan, C. W.....New York City
Buck, H. R.....Hartford, Conn.
Buck, R. S.....New York City
Buel, A. W.....New York City
Buettner, O. G. H....New York City
Burdett, F. A.....New York City
Burpee, G. W.....New York City
Burr, W. H.....New York City
Burroughs, H. R.....New York City
Bush, E. W.....Hartford, Conn.
Bush, Lincoln.....New York City

Cadwallader, W. L...New York City
Calvert, L. L.....New York City
Campbell, C. C.....Philadelphia, Pa.
Carlile, T. J.....Jamaica, N. Y.
Carmalt, L. J....New Haven, Conn.
Carpenter, A. W.....Yonkers, N. Y.
Carr, A.....East Orange, N. J.
Carstarphen, F. C.....Trenton, N. J.
Casani, A. A.....New York City
Case, M. B.....Philadelphia, Pa.
Casler, M. D.....Mt. Vernon, N. Y.
Castillo y Grau, A..Cienfuegos, Cuba
Castleman, F. L.....Pencoyd, Pa.
Chadwick, C. H.....New York City
Chandler, E. M.....New York City
Chapman, A. G.....Albany, N. Y.
Chase, C. E.....Philadelphia, Pa.
Chase, C. F.....New Britain, Conn.
Chase, J. C.....Derry Village, N. H.
Chester, J. N.....Pittsburgh, Pa.
Chorlton, W. H.....New York City
Cilley, M.....New York City
Clapp, S. K.....Grand Gorge, N. Y.
Clark, A. E.....New York City
Clark, F. J.....Dobbs Ferry, N. Y.
Clark, G. H.....New York City
Clarke, E. W.....Baltimore, Md.
Clarke, St. J.....Bogota, N. J.
Codwise, H. R.....Brooklyn, N. Y.
Coe, D. W.....Pearl River, N. Y.
Coffin, F. D. L.....Katonah, N. Y.
Coffin, W. C.....New York City
Cohen, A. B.....Newark, N. J.
Cole, E. S.....New York City
Collins, C. D.....New York City
Collins, R. G.....Cumberland, Md.
Collyer, N.....New York City
Conard, W. R.....Burlington, N. J.
Conard, W. W.....Norristown, Pa.
Conger, R. A.....Worcester, Mass.
Conley, W. A.....New York City
Connelly, J. A. A....New York City
Conover, C. E.....New York City
Constable, H.....Kingston, Mass.
Cook, J. H.....Paterson, N. J.
Coombs, A. W.....New York City
Coombs, S. E.....New York City
Corkran, W. S...East Orange, N. J.
Cornell, G. B.....Yonkers, N. Y.
Covert, C. C.....Albany, N. Y.
Crane, A. S.....New York City
Craigmile, C. J.....Wanague, N. J.
Craven, A. S.....Philadelphia, Pa.
Cresson, B. F., Jr....New York City
Creuzbaur, R. W....New York City
Critchlow, H. T.....Trenton, N. J.
Crooks, C. H.....New York City
Crosby, H.....Maplewood, N. J.
Cross, W. C.....Brooklyn, N. Y.
Crowell, F. S.....New York City
Cuddeback, A. W.....Paterson, N. J.
Cudworth, F. E.....Brooklyn, N. Y.
Cullen, J. F.....Philadelphia, Pa.

Culyer, T. C.....New York City
Cummings, N.....Mt. Vernon, N. Y.
Cummings, R. A.....Pittsburgh, Pa.
Curtis, F. S.....Boston, Mass.
Cushing, W. C.....Philadelphia, Pa.
Cutler, L. G.....Nutley, N. J.

Dahm, S.....New York City
Daino, A. J.....New York City
Dakin, A. H., Jr.....New York City
Dalstrom, O. F.....Chicago, Ill.
Daly, J. W.....New Rochelle, N. Y.
Dana, A.....Philadelphia, Pa.
Danforth, G. C.....Augusta, Me.
Darrow, F. T.....Lincoln, Nebr.
Davies, J. V.....New York City
Davis, A. P.....Washington, D. C.
Davis, B. H.....New York City
Davis, C.....New York City
Davis, F. A. W.....New York City
Davis, J. L.....Montpelier, Vt.
Davis, L. H.....New York City
Dawley, W. M.....New York City
Day, C. I.....Troy, N. Y.
Day, E. B.....New York City
Deakman, H. W.....Brooklyn, N. Y.
de Charms, R., Jr...Westfield, N. J.
Deiser, N. A.....Brooklyn, N. Y.
Delson, I.....New York City
de Moll, C.....Philadelphia, Pa.
Denise, C. M.....Pittsburgh, Pa.
Dennett, R. C.....New York City
De Schauensee, F....New York City
Develin, R. G.....Philadelphia, Pa.
Devlin, H. S.....Brooklyn, N. Y.
De Witt, P. H.....Newark, N. J.
Deyo, S. L. F.....New York City
Diamant, A. H.....New York City
Dickerson, O. H.....Duluth, Minn.
Digby, J. H.....Brooklyn, N. Y.
Dimon, D. Y.....Riverhead, N. Y.
Dingman, C. F.....Palmer, Mass.
Disbrow, C. A.....New York City
Dittman, W. A.....Yonkers, N. Y.
Diven, J. M.....New York City
Dixon, G. G.....Akron, Ohio
Donnelly, A. L...New Haven, Conn.
Dorrance, W. T...New Haven, Conn.
Doten, L. S.....Washington, D. C.
Dougherty, R. E.....New York City
Dresser, G. L.....Albany, N. Y.
Drew, C. D.....New York City
Drummond, W. W.,
Fort H. G. Wright, N. Y.
Dudley, F. L.....Ambridge, Pa.
Dufour, F. O.....Easton, Pa.
Dunham, H. F.....New York City
Durant, A.....Boston, Mass.
Durfee, J. J.....Pavillion, N. Y.
Durham, L.....Pleasantville, N. Y.
Dutton, C. H.....Providence, R. I.
Dyer, A. J.....Nashville, Tenn.
Dykeman, C. F.....Brooklyn, N. Y.

Earle, T.....Bethlehem, Pa.
Eddy, H. P....Newton Center, Mass.
Eden, A. W. A...East Orange, N. J.
Edwards, D. G.....Jamaica, N. Y.
Edwards, J. H.....New York City
Ehle, Boyd.....East Creek, N. Y.
Eide, Torris.....New York City
Elkins, S. S.....Brooklyn, N. Y.
Elliott, H.....New York City
Endemann, H. K.....New York City
Epple, E. C.....Bloomfield, N. J.
Estes, A. D.....New York City
Evers, R.....New York City

Fairchild, J. F.....Pelham, N. Y.
Fajardo, J.....Cali, Colombia
Falk, M. S.....New York City
Farley, J. M....White Plains, N. Y.
Farrington, H.....Middleboro, Mass.
Farrington, H. P....New York City
Fay, F. H.....Boston, Mass.
Fenkell, G. H.....Detroit, Mich.
Files, T. H.....New York City
Finch, J. K.....New York City
Finebaum, H. J.....Bethlehem, Pa.
Fisher, E. A.....Rochester, N. Y.
Fletcher, R.....Hanover, N. H.
Flinn, A. D.....New York City
Fogg, R. J.....Bethlehem, Pa.
Forbes, F. B.....New York City

Forgie, J.....New York City
Foster, E. H....Dongan Hills, N. Y.
Fougner, H.....New York City
Frank, A. H.....Brooklyn, N. Y.
Freeman, A. C., Jr..Philadelphia, Pa.
Freeman, J. R.....Providence, R. I.
Freeman, W. B.....Denver, Colo.
French, A. W.....Worcester, Mass.
French, H.....New York City
French, J. B.....New York City
Frisby, E. R.....Washington, D. C.
Fuller, G. W.....New York City
Fuller, M. E.....New York City

Gallogly, A. V.....Yonkers, N. Y.
Gardiner, F. W.....New York City
Gardiner, J. B. W....New York City
Gardner, H. C.....Lancaster, Pa.
Gardner, W.....New York City
Garfias, V. R.....New York City
Gaston, L. P.....Somerville, N. J.
Gates, H. B.....Mt. Kisco, N. Y.
Gausmann, R. W.....Albany, N. Y.
Gaylord, L. T.....Montclair, N. J.
Gemberling, J. B...Philadelphia, Pa.
Gendell, D. S., Jr.....Pottstown, Pa.
George, H. H.....Newark, N. J.
Gibbs, G.....New York City
Gifford, G. E.....New York City
Gildersleeve, A. C....New York City
Gildersleeve, G. S....New York City
Giles, J. A.....Binghamton, N. Y.
Gilman, C.....New York City
Gilmore, T. N.....New York City
Givotovsky, V. T.....New York City
Glander, J. H., Jr..Glen Ridge, N. J.
Goldmark, H.....New York City
Goldsborough, J. B...New York City
Goldsmith, W.....New York City
Goodell, J. M.....Montclair, N. J.
Goodkind, M..New Brunswick, N. J.
Goodman, J.....New York City
Goodrich, E. P.....Brooklyn, N. Y.
Goriachkovsky, V....New York City
Gould, R. R.....New York City
Gould, W. T.....Hastings, N. Y.
Graham, G. A.....Brooklyn, N. Y.
Graham, R. R.....Yonkers, N. Y.
Granbery, J. H.....Paris, France
Gray, H. M.....Katonah, N. Y.
Gray, W.....New York City
Green, B. L.....Cleveland, Ohio
Greene, C.....New York City
Greenhalgh, S. F.....Avenel, N. J.
Greenlaw, R. W.....New York City
Gregory, A. C.....Trenton, N. J.
Gregg, T. D.....Newark, N. J.
Greiner, J. E.....Baltimore, Md.
Griggs, T. G.....Hoboken, N. J.
Groat, B. F.....Pittsburgh, Pa.
Gross, C. F.....Philadelphia, Pa.
Grove, W. G.....New York City
Grover, W. A.....Dover, N. H.
Grunsky, C. E..San Francisco, Calif.
Gunther, C. O.....Hoboken, N. J.

Hager, A. B.....Rutherford, N. J.
Haggard, H. H...Hackensack, N. J.
Haines, E. G.....New York City
Hale, H. E.....New York City
Hale, R. A.....Lawrence, Mass.
Hall, M. W.....New York City
Hall, W. H.....New Britain, Conn.
Halmos, E. E.....New York City
Halsey, W. H...Southampton, N. Y.
Hamilton, E. P.....New York City
Hamilton, John W...New York City
Hammond, H. P....Brooklyn, N. Y.
Hanavan, W. L.....Tenafly, N. J.
Hansel, C.....New York City
Harby, I.....New York City
Hardesty, S.....New York City
Harding, H. S..Pelham Manor, N. Y.
Harris, H. F.....Trenton, N. J.
Harrison, B. J.....Brooklyn, N. Y.
Harrison, G.....New York City
Harte, C. R.....New Haven, Conn.
Hartwell, O. W.....Trenton, N. J.
Harwi, S. J.....Bayonne, N. J.
Haskins, W. J.....New York City
Hatton, T. C.....Milwaukee, Wis.
Hauck, W.....New York City
Havens, V. L.....New York City
Haydock, C.....Philadelphia, Pa.

Hazen, A.....New York City
Heller, J. W...South Orange, N. J.
Helling, H. A.North Tarrytown, N. Y.
Hellyer, H. A. C.....Tenafly, N. J.
Henckel, A. H.....Maplewood, N. J.
Henderson, A. R...Jersey City, N. J.
Hennebique, J. J.....New York City
Henny, D. C.....Portland, Ore.
Henry, P. W.....New York City
Herschel, Clemens....New York City
Heslop, P. L.....Philadelphia, Pa.
Hewes, V. H.....New York City
Higgins, C. H.....New York City
Higgins, J. W...Roselle Park, N. J.
Hill, H. C.....Binghamton, N. Y.
Hilpert, M. G.....Bethlehem, Pa.
Hilts, H. E.....Harrisburg, Pa.
Hirst, A.....New York City
Hoadley, R. B., Jr..Binghamton, N. Y.
Hobbs, H. W.....New York City
Hodgdon, B. A.....New York City
Hodgman, B. B.....New York City
Hogan, J. P.....New York City
Holden, C. A.....New York City
Holden, C. A.....Hanover, N. H.
Holdredge, N. C.....Haskell, N. J.
Holland, C. M.....New York City
Hollyday, R. C.....Brooklyn, N. Y.
Holtzman, S. F.....Hastings, N. Y.
Honness, G. G...Grand Gorge, N. Y.
Hood, B. O.....Newark, N. J.
Hooper, E. G.....New York City
Hoover, A. P.....New York City
Hopson, E. G.....Portland, Ore.
Horne, H. W.....Belmont, Mass.
Horton, R. E.....Albany, N. Y.
Hough, D. L.....New York City
Howard, J. L.....Boston, Mass.
Howe, W. C.....Worcester, Mass.
Howes, D. W.....New York City
Howes, B. A.....New York City
Howson, E. T.....Chicago, Ill.
Hoyt, J. C.....Washington, D. C.
Huber, W. L...San Francisco, Calif.
Hudson, C. W.....New York City
Hughes, H. J.....Cambridge, Mass.
Hulburd, L. S.....Albany, N. Y.
Hulsart, C. R.....New York City
Humphrey, Richard L.,
Philadelphia, Pa.
Hunt, C. A.....Brooklyn, N. Y.
Hunt, C. E.....New York City
Hunt, R. W.....Boonton, N. J.
Hurd, H. L.....New York City
Hurlbut, C. C.....New York City
Hurlbut, H. B.....Montclair, N. J.
Hutchins, E.....New York City
Hyatt, C.....New York City
Hyde, H. E.....Ithaca, N. Y.
Hyman, A. D.....New York City
Hyman, H. A.....Woodmere, N. Y.

Ingersoll, C. M.....New York City
Irwin, J. C.....Boston, Mass.

Jackson, J. F.....New Haven, Conn.
Jackson, W. B.....Pittsfield, Mass.
Jacobsen, H. R.....Brooklyn, N. Y.
James, F. T.....Cambridge, Mass.
Joachimson, M.....New York City
Johnson, G. A.....New York City
Johnston, J. A.....Worcester, Mass.
Johnston, J. H.....Atlanta, Ga.
Johnston, J. W.....New York City
Johntz, A. F.....Aberdeen, Md.
Jones, S. R.....New York City
Junkersfeld, P.....Boston, Mass.

Kahlert, E. D.....Freeport, N. Y.
Kastl, A. E.....Rutherford, N. J.
Kayser, E. M.....New York City
Keefe, D. A.....Athens, Pa.
Kehoe, A. L.....New York City
Keith, H. C.....New York City
Ketchum, M. S.....Philadelphia, Pa.
Khuen, R., Jr.....Pittsburgh, Pa.
Killmer, M. I.....East Orange, N. J.
Killough, E. M.....Baltimore, Md.
Kimball, F. C.....Summit, N. J.
King, H. L.....Brooklyn, N. Y.
Kinsey, W. A.....Newark, N. J.
Kipp, B.....New York City
Kirkwood, H. C.....Flushing, N. Y.
Knight, H. M.....Montclair, N. J.

Knight, R. W.....New York City
Knight, S. H.....Philadelphia, Pa.
Knighton, J. A.....New York City
Knox, S. B.....New York City
Kohlheyer, C. C.....New York City
Kornfeld, A. E.....New York City
Kramer, W. D...Scarborough, N. Y.
Kraus, A.....Brooklyn, N. Y.
Krefeld, W. J.....New York City
Kuchar, F. M.....Montvale, N. J.
Kunesh, J. F.....Brooklyn, N. Y.

Laboon, J. F.....Pittsburgh, Pa.
Lamb, L. C....Cuyahoga Falls, Ohio
Lame, H. F.....New York City
Lamphere, F. E.....New York City
Lamson, W. M.....Brooklyn, N. Y.
Lanagan, F. R.....Albany, N. Y.
Landreth, O. H.....New York City
Lang, P. G., Jr.....Baltimore, Md.
Langthorn, J. S.....New York City
Larsson, C. G. E.....Plainfield, N. J.
Latey, H. N.....New York City
Latta, H. W.....Philadelphia, Pa.
Laurson, P. G....New Haven, Conn.
Lawrence, E. V.....New York City
Lawrence, R. J.....Philadelphia, Pa.
Lea, R. S....Montreal, Que., Canada
Leahy, T. E.....Philadelphia, Pa.
Lee, W. B.....New York City
Leffler, B. R.....Cleveland, Ohio
Lehlbach, G.....Newark, N. J.
Lemberger, O.....New York City
Leon, H. M.....Brooklyn, N. Y.
Lesley, R. W.....Philadelphia, Pa.
Lewis, H. M.....Brooklyn, N. Y.
Lewis, L. H.....New York City
Lewis, N. P.....Brooklyn, N. Y.
Lex, W. I.....Philadelphia, Pa.
Lieb, J. W.....New York City
Lilliestrand, C. E....Pittsfield, Mass.
Lobo, C.....Brooklyn, N. Y.
Lockwood, W. D....Philadelphia, Pa.
Loewenstein, J.....New York City
Logan, J.....Mount Holly, N. J.
Look, F. W.....Paterson, N. J.
Look, M. J.....Hope, R. I.
Lovell, E. B.....New York City
Lowinson, O.....New York City
Lucas, G. L.....New York City
Lund, G. A.....Bridgeport, Conn.
Lundie, J.....New York City

MacCornack, C.....Phoenixville, Pa.
MacFeeters, J. O..Glen Ridge, N. J.
MacGregor, R. A....New York City
Machen, H. B.....New York City
Macksey, H. V..Framingham, Mass.
McCarthy, D. F....Bronxville, N. Y.
McCollough, C. A....New York City
McComb, C. O.....Adams, N. Y.
McComb, D. E....Washington, D. C.
McDougall, A. H.....Harvey, Ill.
McDowell, F. F.....Yonkers, N. Y.
McElroy, J. A.....Bridgeport, Conn.
McInnes, F. A.....Boston, Mass.
McIntyre, W. A....Philadelphia, Pa.
McKean, A. M., Jr...Brooklyn, N. Y.
McLoud, P.....Whiteboro, N. Y.
McMinn, T. J.....Bridgeport, Conn.
McNaughton, W. C.,
West Englewood, N. J.
McNeal, J.....Easton, Pa.
McPike, M. J.....Brooklyn, N. Y.
Main, C. T.....Boston, Mass.
Mandell, S. B.....New York City
Manley, H., Jr.....Elmhurst, N. Y.
Manley, L. B.....Philadelphia, Pa.
Marsden, R. R.....Hanover, N. H.
Marshall, C. E. D..Garden City, N. Y.
Marshall, L. S.....New York City
Marshall, R. A.....New York City
Marston, A.....Ames, Iowa
Martin, E. S..Toronto, Ont., Canada
Massa, W. J...Port Richmond, N. Y.
Masters, F. M.....Harrisburg, Pa.
Matheson, J. D.....Yonkers, N. Y.
Matlaw, I. S.....New York City
Mayell, A. J.....New York City
Mazeau, A.....New York City
Mazeau, C.....Milford, Conn.
Mead, C. A...Upper Montclair, N. J.
Meadowcroft, W.....New York City
Mebus, C. F.....Philadelphia, Pa.

Mehren, E. J.....New York City
Meigs, J.....Philadelphia, Pa.
Meise, G. J.....New York City
Melius, L. L.....New York City
Merriman, R. M.....New York City
Merriman, T.....New York City
Merryman, W. C.....New York City
Metcalf, L.....Boston, Mass.
Miller, A. B.....New York City
Miller, C. W.....Phoenix, Ariz.
Miller, M.....New York City
Miller, M. S.....Cranford, N. J.
Miles, G. F.....New York City
Miner, J. H.....Dobbs Ferry, N. Y.
Mitchell, E. I.....Brooklyn, N. Y.
Mitchell, S. P.....Philadelphia, Pa.
Modjeski, R.....Chicago, Ill.
Moffett, J. W.....New Haven, Conn.
Mogensen, O. E.....New York City
Moisseiff, L. S.....Brooklyn, N. Y.
Molitor, F. A.....New York City
Moore, E. J.....Yonkers, N. Y.
Moore, F. C.....New York City
Moore, F. F.....New York City
Morris, L. V.....Jamaica, N. Y.
Morrison, G.....Yonkers, N. Y.
Morse, C. F.....Southampton, N. Y.
Moss, R. E.....Glenridge, N. J.
Mott, W. E.....Pittsburgh, Pa.
Mowlds, E.....Pencoyd, Pa.
Mozart, W. J.....New Haven, Conn.
Muirhead, J. H. H...New York City
Murphy, J. F.....New York City
Myers, J. H.....New York City

Nelson, J. W.....Brooklyn, N. Y.
Neumeyer, R. E.....Bethlehem, Pa.
Newhall, L. R.....Oakville, Conn.
Nial, W. A.....Troy, N. Y.
Nichol, H. S.....New York City
Nichols, C. H....New Haven, Conn.
Norcross, P. H.....Atlanta, Ga.
Norris, W. H.....Portland, Me.
Northrop, A. A.....Boston, Mass.

Oakley, G. I.....Little Falls, N. Y.
Ockert, F. W.....New York City
O'Connor, J. A.....Albany, N. Y.
Odell, F. S.....Port Chester, N. Y.
Ogden, C. W.....New York City
Ogden, H. N.....Ithaca, N. Y.
Ogden, J. C.....New York City
Oleri, F. J....West New York, N. J.
Orlian, I.....Philadelphia, Pa.
O'Rourke, J. F.....New York City
Orr, Alexander....Gloversville, N. Y.
Orrok, G. A.....Willimantic, Conn.
Oser, H. I.....New York City
Ott, S. J.....Rutherford, N. J.

Paaswell, G.....New York City
Paddock, H. C.....Caldwell, N. J.
Paine, H. A.....New York City
Palmer, E. P.....Mt. Vernon, N. Y.
Palmer, S. B.....Norwich, Conn.
Pardoe, W. S.....Philadelphia, Pa.
Parker, C. J.....New York City
Parker, J. L.....Columbia, S. C.
Parkhurst, R. W.....New York City
Parmley, W. C.....New York City
Parsons, H. de B.....New York City
Parsons, R. S.....New York City
Patterson, C. A...Torrington, Conn.
Payrow, H. G.....Bethlehem, Pa.
Peabody, W. W....Providence, R. I.
Peck, J. S.....New York City
Peck, L. F.....Hartford, Conn.
Pegram, G. H.....New York City
Peiser, F.....Newark, N. J.
Pendergrass, R. A..Philadelphia, Pa.
Perrine, G.....New York City
Perry, F. W.....Brooklyn, N. Y.
Perry, J. P. H.....New York City
Perry, L.....Easton, Pa.
Philips, G. W.....Wayne, Pa.
Philips, J. H.....Newark, N. J.
Pickersgill, W. C.....Boston, Mass.
Pitcairn, H. H.....Philadelphia, Pa.
Pohl, C. A.....New York City
Poland, W. B.....New York City
Pollock, C. D.....New York City
Pond, F. H.....Brooklyn, N. Y.
Poole, C. A.....Rochester, N. Y.
Poore, H. C....East Braintree, Mass.

Porter, D.....Malden, Mass.
Porter, J. E.....Yonkers, N. Y.
Porter, H. T.....Greenville, Pa.
Porter, J. M.....Easton, Pa.
Post, C. W.....Albany, N. Y.
Potter, A.....New York City
Potts, C.....New York City
Powell, C. U.....Flushing, N. Y.
Powers, C. V. V.....New York City
Praeger, E.....Brooklyn, N. Y.
Pratt, A. H.....Newark, N. J.
Preston, G. H.....Bloomfield, N. J.
Preston, H. L.....New York City
Price, F.....Glen Cove, N. Y.
Price, F. O.....Brooklyn, N. Y.
Price, P. L.....Mount Vernon, N. Y.
Priest, B. B.....New York City
Prince, A. D.....New York City
Proctor, R. F.....Baltimore, Md.
Pugh, M. R.....Wayne, Pa.
Putnam, G. R.....Washington, D. C.

Quimby, H. H.....Philadelphia, Pa.
Quimby, J. H.....Pearl River, N. Y.

Ralston, J. C.....Spokane, Wash.
Rapalje, DeW.....New York City
Rea, Samuel.....Philadelphia, Pa.
Reeves, A. H.....Clinton, N. J.
Reeves, W. F.....New York City
Reichmann, A. F.....Chicago, Ill.
Reimann, R.....Relay, Md.
Reinhardt, J. B.....Rochester, N. Y.
Renner, C. J..West Saugerties, N. Y.
Reynolds, A. M.....Newark, N. J.
Reynolds, R. W.....New York City
Rhett, A. H.....New York City
Richardson, J. D.....Corona, N. Y.
Ricketts, A. T.....New York City
Ridgway, H.....New York City
Ridgway, R.....New York City
Rights, L. D.....New York City
Ripley, H. L.....Brockton, Mass.
Ripley, J.....Albany, N. Y.
Roach, J. H.....New York City
Robbe, L. E.....Gilboa, N. Y.
Robbins, D. W.....Utica, N. Y.
Robbins, F. H.....New York City
Roberts, R. F.....New York City
Roberts, T. C.....New York City
Robinson, E. F.....New York City
Robinson, E. W.....New York City
Rodgers, G. B.....New York City
Rogers, A.....New York City
Rogers, E. H....West Newton, Mass.
Ross, K. W.....New York City
Rowland, J. H.....New York City
Rowland, W.....New York City
Ruckes, J. J., Jr.....New York City
Ryder, E. M. T.....New York City

Sabin, A. H.....Flushing, N. Y.
Sackett, A. J.....Flushing, N. Y.
Sackett, R. L.....State College, Pa.
Sacks, S. I.....Philadelphia, Pa.
Sanborn, F. B.....Boston, Mass.
Sanborn, J. F.....New York City
Sando, W. J.....Milwaukee, Wis.
Sanford, H. C.,
Long Island City, N. Y.
Sargent, P. D.....Augusta, Me.
Saunders, R. S.....New York City
Saunders, W. L.....New York City
Saville, C. M.....Hartford, Conn.
Sawin, S. W.....Marshallton, Del.
Sawyer, D. H.....New York City
Sawyer, E. W.....London, England
Sawyer, G. I.....New York City
Scacciaferro, S. J.....Clifton, N. J.
Schaefer, C. H.....Philadelphia, Pa.
Schall, F. E.....Bethlehem, Pa.
Scheidenhelm, F. W..New York City
Schermerhorn, R., Jr.New York City
Schmitt, F. E.....New York City
Scholtz, H. F.....Passaic, N. J.
Schonberg, J. R.....Elizabeth, N. J.
Schwarze, C. T.....New York City
Schweizer, R., Jr.,
Ridgefield Park, N. J.
Scott, W. V.....Flushing, N. Y.
Scrimshaw, J. F....Arlington, N. J.
Sealey, D. A.....New York City
Seaman, H. B.....New York City
Searle, C. D.....New York City

Searle, L. F.....Allaben, N. Y.
Sears, H. H.....New York City
Selby, O. E.....Cincinnati, Ohio
Selmer, W. L.....New York City
Senior, F. S.....Montgomery, N. Y.
Seward, H. C.....Brooklyn, N. Y.
Shaw, D. J.....Brooklyn, N. Y.
Shaw, G. H.....Philadelphia, Pa.
Shea, W. J.....Brooklyn, N. Y.
Shellenberger, L. R...Bayonne, N. J.
Shelley, H. T.....Pittsburgh, Pa.
Shepard, R. B., Jr..Wilmington, N. C.
Sherman, A. L.....Newark, N. J.
Sherman, H. J.....Camden, N. J.
Shoemaker, L. H.....New York City
Sikes, Z. H.....Yonkers, N. Y.
Silliman, C.....Washington, D. C.
Sitt, W. T.....New York City
Skillin, E. S.....New York City
Skinner, F. F.....Mt. Vernon, N. Y.
Skinner, F. W.....New York City
Skinner, J. F.....Rochester, N. Y.
Skinner, T. H.....Oneida, N. Y.
Sloan, S. A.....Philadelphia, Pa.
Slocum, H. S.....New York City
Smith, A.....Elizabeth, N. J.
Smith, C. W.....Newburyport, Mass.
Smith, E. M.....New York City
Smith, H. E.....Binghamton, N. Y.
Smith, H. H.....New York City
Smith, J. R.....New York City
Smith, J. W.....New York City
Smith, M. A.....Brooklyn, N. Y.
Smith, M. H.....New York City
Smith, W. F.....Harriman, Pa.
Smoley, C. K.....Scranton, Pa.
Snell, E. B.....New York City
Snell, H. B.....Deposit, N. Y.
Snell, T. C. B.....New York City
Snow, C. H.....New York City
Snow J. B.....Forest Hills, N. Y.
Snyder, F. A.....New York City
Soest, H. C.....New York City
Solomon, G. R.....New York City
Soper, G. A.....New York City
Spear, C. J.....New York City
Spear, W. E.....Merrick, N. Y.
Spencer, T. N.....New York City
Sperry, H. M.....New York City
Spofford, C. M.....Cambridge, Mass.
Squire, E. J.....Brooklyn, N. Y.
Stark, C. W.....Tarrytown, N. Y.
Stearns, F. L.....Scarsdale, N. Y.
Stearns, R. H.....New York City
Stepath, C. U.....Springfield, Mass.
Steele, H. W.....Uniontown, Pa.
Steffens, W. F.....New York City
Stern, E. W.....New York City
Stephens, A. W.....New York City
Stevens, J. F.....Manchuria, China
Stevenson, W. F..New Rochelle, N. Y.
Stiles, A. I.....New York City
Stone, W. W.....Glen Cove, N. Y.
Stowe, H. C.....Brooklyn, N. Y.
Stowitts, G. P.....Yonkers, N. Y.
Strachan, J.....Brooklyn, N. Y.
Strachan, J. J.....New York City
Strachan, R. C.....New York City
Strehan, G. E.....New York City
Strickler, G. B....Washington, D. C.
Strobel, C. L.....Chicago, Ill.
Stuart, F. L.....New York City
Sudler, C. E.....New York City
Sullivan, J. F.....New York City
Swaab, S. M.....Philadelphia, Pa.
Swasey, A.....Cleveland, Ohio
Swezey, E. C..Clinton Corners, N. Y.
Swift, W. E.....New Canaan, Conn.
Swindells, J. S.....New York City
Symonds, G. R. B.....Nutley, N. J.

Taber, G. A.....Boston, Mass.
Taggart, R. C.....Albany, N. Y.
Tainter, F. S.....New York City
Talbot, A. N.....Urbana, Ill.
Talbot, E.....Weehawken, N. J.
Taylor, C. F.....Foochow, China
Taylor, E. A.....New York City
Taylor, G. L.....Pittsburgh, Pa.
Taylor, M. P.....Hopewell, Va.
Taylor, W. G.....Newark, N. J.
Teal, J. E.....Baltimore, Md.
Temple, E. B.....Philadelphia, Pa.
Tenny, W. R.....Brooklyn, N. Y.

Theban, J. G....Pleasantville, N. Y.
Thomas, C. D.....Hempstead, N. Y.
Thomassen, V. G....Brooklyn, N. Y.
Thomes, E. H.....Jamaica, N. Y.
Thompson, C. R....Philadelphia, Pa.
Thompson, P.....Yonkers, N. Y.
Thompson, S. E.....Boston, Mass.
Thompson, W. G. B...Trenton, N. J.
Thomson, T. K.....New York City
Tidd, A. W.....White Plains, N. Y.
Tighe, J. L.....Holyoke, Mass.
Timberlake, S. M....Brooklyn, N. Y.
Tippet, H. J.....New Haven, Conn.
Tompkins, C. H..Washington, D. C.
Tompkins, E. de V...New York City.
Torrey, J. E.....Paterson, N. J.
Tower, J. W.....New York City
Townsend, C. McD...Brooklyn, N. Y.
Townsend, F. T.....New York City
Trautwine, J. C., Jr.Philadelphia, Pa.
Travell, W. B.....New York City
Trees, M. J.....Chicago, Ill.
Tretter, G. A.....Roanoke, Va.
Tribus, L. L.....New York City
Triest, W. G.....New York City
Troelsch, H. W.....New York City
Trout, C. E.,
West New Brighton, N. Y.
Trueheart, E.....La Paz, Bolivia
Trumbull, M. K.....New York City
Tucker, L. W....Rutherford, N. J.
Tull, R. W.....New York City
Turner, D. L.....New York City
Turner, H. C.....New York City
Tuska, G. R.....New York City
Tuttle, A. S.....New York City

Ungrich, M. J.....New York City
Upton, J.....Flushing, N. Y.

Vail, E. M.....Plainfield, N. J.
Van Cleve, H. P.....Cranford, N. J.
Vanderbrook, R. H..Brooklyn, N. Y.
Van Duyne, J. R.....Newark, N. J.
Van Dyke, C. W.....New York City
Van Keuren, C. A..Jersey City, N. J.
Van Scoyoc, H. S.,
Montreal, Que., Canada
Van Suetendael, A. O.Yonkers, N. Y.
Verner, J.....Linden, N. J.
Vermeule, C. C.....New York City
Verveer, E. L.....New York City
Vincent, J. I.....New York City
Vogel, J. L.....Newark, N. J.
Voorhees, B. S.....Yonkers, N. Y.
Vredenburgh, W....New York City.
Vroman, G.....Mount Vernon, N. Y.

Wadsworth, J. E....New York City
Wagner, J., Jr.....Philadelphia, Pa.
Wagner, S. T.....Philadelphia, Pa.
Wahlman, P.....New York City
Waite, G. B.....New York City
Waite, G. B., Jr.....New York City
Waldron, S. P.....Boston, Mass.
Walker, W. T....Minneapolis, Minn.
Wall, E. E.....St. Louis, Mo.
Warnock, W. H...Greenwich, Conn.
Warwick, C. L.....Philadelphia, Pa.
Watson, C. D.....Madison, N. J.
Watson, G. L.....New York City
Webb, W. T..Rio de Janiero, Brazil
Webster, A. L.....New York City
Webster, G. S.....Philadelphia, Pa.
Webster, M. A.....Philadelphia, Pa.
Weed, L. W.....Brooklyn, N. Y.
Weller, W. E.....Binghamton, N. Y.
Wells, C. E.....North Adams, Mass.
Welty, H. T.....New York City
Wendt, E. F.....Washington, D. C.
Weston, C. M.....New York City
Weston, R. S.....Boston, Mass.
Wheeler, F. I., Jr.....Newark, N. J.
Wheeler, H. R.....New York City
Wheelock, D. F. A.....Warren, Pa.
Whipple, G. C.....Cambridge, Mass.
Whipple, J. B.....Bridgeport, Conn.
Whinery, S.....New York City
Whiskeman, J. P.....New York City
White, L.....New York City
White, W. M.....New York City
Whited, W.....Harrisburg, Pa.
Whitney, G. C.....Brooklyn, N. Y.

Whitson, A. U.....Flushing, N. Y.
Widdicombe, S. H...Phœnixville, Pa.
Wigley, C. G.....New York City
Wilcock, F.....Brooklyn, N. Y.
Wildes, W. G.....Rochester, N. Y.
Wilgus, W. J.....New York City
Wilkerson, T. J...Beaver Falls, Pa.
Willcox, H.....New York City
Williams, F.....East Orange, N. J.
Williams, G. S.....Ann Arbor, Mich.
Williams, J. P. J...New York City
Williams, M. W.....New York City
Willoughby, J. E..Wilmington, N. C.
Wilmot, J.....New York City
Wilson, B.....New York City
Wilson, C. W. S. New Rochelle, N. Y.
Wilson, W. T.....New York City
Wilson, W.....New York City
Winblad, B. E.....New York City
Winn, G. P.....Nashua, N. H.
Winslow, F. I....Framingham, Mass.
Winsor, F. E.....Providence, R. I.
Winsor, G. A.....Pleasantville, N. Y.
Winsor, H. D.,
West New Brighton, N. Y.
Wintermute, F. C..Wilkes-Barre, Pa.
Wise, J. G.....White Plains, N. Y.
Wise, R. S.....Passaic, N. J.
Wolfe, F. C.....Baltimore, Md.
Wolff, R. B.....Glendale, N. Y.
Wood, W. B.....Wilmington, Del.
Woodard, S. H.....New York City
Wortendyke, N. D..Jersey City, N. J.
Wright, F. H.....Pittsburgh, Pa.
Wright, F. J.....Paterson, N. J.
Wyckoff, C. R.....New York City

Yates, J. J.....Jersey City, N. J.
Yereance, W. B.....New York City
Young, C. G.....New York City
Young, H. A.....Maplewood, N. J.

Zeltner, E. L.....Elmhurst, N. Y.
Zook, M. A.....Plainfield, N. J.

WORLD ACTIVITIES AND THEIR EFFECT UPON THE ENGINEER

ADDRESS BY FRANK A. VANDERLIP, ESQ., AT THE ANNUAL MEETING,
JANUARY 19TH, 1922.

Coming down the elevator in the Equitable Building recently, I had an optimist for a co-passenger, that is, I would say he was an optimist. One man said to his companion, "What do you think of business"? The other replied, "If they get that European situation fixed up, I think we are going to have good business." So do I. I am not certain, however, that any one who believes the European situation is going to be fixed up, comprehends what the European situation is. I am afraid the European situation is not going to be fixed up right away. It has been fixed up somewhat. Any one who was in Europe at the end of the war and who, to-day, would make a comparison with the situation he saw then, would say that a great deal had been fixed up. There has been real material recovery pretty much all over Europe. The wound of the war itself is being healed. The wound of the war itself was not such an impossible wound to heal. It was a horrible wound. Europe was terribly hurt by the direct damage of the war and by its cost; but the world has had wars before—never one quite like this—and has recovered more or less quickly, and could have recovered from this direct hurt, I believe, without any such cataclysm as we have had.

Although the wound of the war was a terrible one; the wound of the peace, I believe, was worse. That is a very strong statement, which perhaps I should not make without some explanation; but to my mind the thing that Europe is suffering from to-day, in the main, has resulted from an unwise peace, conceived in such a way that there was no healing qualities in it, conceived with a desire to crush; and it is easy to see why there was a desire to crush. Any one who traveled over that battle-front, as I did, directly after the war, who saw the terrible damage done, can understand how men meeting with that fresh in their minds should have created a peace that was not magnanimous. It was not a magnanimous peace, nor was it a wise peace, economically speaking. It has fanned the old racial prejudices into a heat, and it has built new fires of intense nationalism. It was of such a character that the faith of nations in one another, in their good will, in their fairness, in their unselfishness, has been badly damaged.

The question is sometimes put, Is European civilization in danger? Is there going to be a decay of European civilization? When people cannot live together, civilization has already begun to decay. Civilization is not measured really by bathtubs and Pullman cars; it is measured by the ability of people to live together. That is the definition of civilization, to my mind. And European peoples are showing an inability to live together. There is intense nationalism—selfishness; there is a desire of each people for its own welfare without much, if any, regard to the welfare of others. That is a narrow-minded desire. It is a desire, really, that cannot be fulfilled, for Europe is an economic unity. I believe that unless Europe is brought to see that, and in

seeing it, governs itself in the light of that fact, there will be still further deterioration of European civilization.

There are nearly half a billion of people in Europe, or in Europe and just that edge of Asia that is really also immediately affected by the war—between one-third and one-quarter of all the people in the world.

The greatest fact to my mind, in all the history of humanity, is the fact of the growth of population in the last century. People talked about the recovery after the Napoleonic wars, and drew comparisons as to what might be expected after this war; and they did that, without any real comprehension of how intricate European society had become; what that unity I speak of meant to Europe, and, conversely, what the breaking up of that unity entailed.

At the end of the Napoleonic wars there were only 175 000 000 people in Europe, and there are now in Europe itself 440 000 000. That change signifies something important in the method by which those people lived. One hundred years ago, Europe was self-sustaining; most countries were individually self-sustaining. There was not a great amount of foreign trade; and there was, as a result of the Napoleonic wars, no serious break-up of world commerce. With the advent of the industrial age, of the age which your forerunners, the engineers of the last century, created, there came this tremendous increase of population made possible by the work of engineers, by better transportation, by the development of power and machinery. So there grew up in those European countries great populations getting an increasingly better living by working in the shops, turning out manufactured goods, transporting them over long distances, and exchanging them for food. With easier conditions of life came a rapid increase of population, until, at the outbreak of the World War, there were 100 000 000 people in Europe who were supporting themselves in workshops and drawing their food from foreign countries, supporting themselves by manufacturing for exports and exchanging their goods for the food and raw material of foreign countries.

Now, the thing that has happened since the war, the thing that makes the European situation so gloomy in some of its aspects, is the breaking down of the whole commercial machine which permitted this interchange of goods, permitted these great populations to live by the exchange of their manufactured goods for the food of other countries. England is a notable example of that. England needs to feed about 30 000 000 of her people with imported food. England must have a composed, orderly world, a world in which foreign trade can be carried on, so that the product of her workshops can go out and create the exchange and bring in the food that she must have.

Germany, to an extent, is in something of the same situation. Approximately, 10 000 000 of her 60 000 000 people were fed by imported food. Several of the smaller countries are in the same situation, that is, Belgium, Switzerland, and the present Czecho-Slovakia. We think of Czecho-Slovakia as an Eastern agricultural country. In fact, it is a great industrial country. Three-fourths of the industries of the old Austrian Empire went to Czecho-Slovakia, and fully half her people are industrially employed, and therefore she feels this food problem, this necessity to exchange goods in order that food may be brought in.

It is the breakdown of the machinery of international trade that I conceive is the great wound from which Europe is suffering to-day. Why has it broken down? The wants are there; the capacity is there. Any one who will travel over all Europe, as I did this summer and fall, and who will travel with open eyes, looking at Europe from the economic point of view, cannot but be struck with the potential richness of Europe, the wonderful extent of her agricultural possibilities, her great plants, her fine transportation, canals, rivers, and railroads. Everything is there in a material way for the welfare of Europe; but a hand of paralysis seems to have been laid on many of those countries, and on many of the people. There is no longer an interchange of goods going on as in pre-war times.

Let us analyze the reason for that. One of the features of the Paris Treaty was self-determination, self-determination that broke up many of the old countries and created many additional new ones. The old Austrian-Hungarian Empire is particularly an example. There were well over 50 000 000 people in the heart of Europe living in an economic unity; there was free interchange of goods; they were a single economic unit. Old Austria was so split up that there was left not much more than a strip of Alpine country, with 6 500 000 people, including a city of nearly 2 000 000. Two-thirds of the whole country was industrial; with about 2 000 000 agriculturists who were placed on land of a character that produced no more than the people needed who lived on that land.

Here was this country having to import all but 100 days' food supply, and having no way to get it but by the export of goods, surrounded by new nations carved largely from the old Empire, that were antagonistic, that were economically blind, that interposed every sort of obstacle in the way of trade. For months, no freight train could be moved across any border. The railroads of the Austrian Empire were the property of the old Government. When those new countries were formed, there was no defining of railroad property. If a freight train crossed a border, the cars never came back again, so they did not cross, and the borders became Chinese walls.

There was for a long time the same situation on the rivers and canals. There was no apportionment, at the time the treaty was made, of the water traffic, and it could not move. That was one of the difficulties. Another was the deterioration of the matter of currency which was common to nearly all Europe, and certainly to all Central Europe. All those Governments after the war, found themselves with budget expenses running beyond their tax receipts. They increased taxes, but there was a ghastly deficit in all those budgets.

A nation with a gap in its budget has the choice of just two ways of filling it: It can borrow money, and to do that it must have political courage and credit. There is another, an easier way—easier it appears at the start—a nation can print money, and that was the course which all the Central European nations followed. They filled the gap in their budget by printing money. The result was a deterioration in the value of the money—a perfectly inevitable result. Nearly all those Governments ran railroads; some of them ran other enterprises. The cost of running railroads increased as the currency deteriorated. The Governments found it impossible to increase the freight

rates as rapidly as the cost of operation increased; I say they found it impossible, they at least did not do it. It was impossible for officials to do it and continue in office; so they began to pile up huge deficits in operating their railroads. In 1920, Germany showed a deficit of 17 000 000 000 marks in operating her railroads and in 1921 considerably more.

Those nations that were short of food had to resort to another thing that led to increasing their budget deficits. The Goverments took command of the food importation. They bought wheat in the markets of the world at a gold equivalent, but when they brought that wheat into the country, wages had not changed—they never will change as rapidly as currency changes in its value—and the Governments felt that they had to sell this food at a price within the range of the ordinary people. So, they bought grain for gold at one price and sold it for a fraction of that price in paper to their own people, and there again huge deficits were created; and as those deficits grew, more printing was necessary. They just traveled down the spiral staircase—more printing, more deficit—more deficit more printing—until we see practically in all the Central European nations a deterioration of currency that is the most shocking in the whole experience of the financial world—a deterioration that keeps going on, a deterioration that has in 1921 brought some currencies down to one-tenth of what their value was at the beginning of the year, and many others to one-half or one-third.

The effect of a depreciating currency, a currency depreciated by such enormous inflation as these countries have gone through, is most profound on the whole social life. The whole standard of value has become something in which no dependence can be placed. One can tell nothing about what the future holds, and that has made the greatest difficulty in trade. A man who can make no future calculation, measured in the money of his country, is at a fatal disadvantage in carrying on a business, and that is the situation in which the business men of most of these countries are placed.

A deteriorating currency, however, has some temporary and apparently good effects. You hear me speaking in a pessimistic way about the European situation, and I do not doubt that there are men here who have certain reservations. They say, "Oh, I do not know about that; I have heard other people who have come home from Europe; they have seen Europe, too, and they have seen a great improvement over there. They have seen people busy; they have been in Germany; they have seen tremendous activity there."

That is true. I have been in Germany and have seen that tremendous industrial activity. I have seen that country change from the work of war to the work of peace in a most phenomenal way. I have seen those great Krupp Works at Essen, which turned out such an enormous quantity of ammunition and arms, turn completely to the works of peace, and employ thousands more men than they were employing at the outbreak of the war. I have seen all Germany busy, and I have seen her foreign trade apparently developing with great rapidity. I have seen her showing a command in the foreign markets that has frightened the manufacturers of competing nations. I have seen her supplying goods at rates astonishingly below what we are able to supply them. Why is this? It is because a deteriorating currency stimulates

exports and may bring great profits to exporters during the period in which the currency deteriorates. An exporter sells his goods in the world markets for the equivalent of gold. He produces them in the home market with the payment of paper. The gold is worth a constantly increasing amount of paper. Wages are never adjusted as rapidly as the currency depreciates. So, he finds himself while the depreciation goes on, at a very great advantage over his foreign competitors. That advantage is of a temporary character; it holds only while the depreciation continues. It stops when the depreciation stops, and a reverse occurs if there is any attempt to bring the currency back to its normal. The manufacturer will then find himself under as great a disadvantage as he was at an advantage during the period of deterioration.

I think Germany has now reached the point where those advantages will soon cease. Wages are not yet adjusted to any comparison with world wages. The wage scale in Germany to-day is an absurdity, measured in gold, and compared with our own wage scale, and is for the time being resulting in an ability to compete with all other manufacturing nations. Deterioration of currency, however, cannot go much further.

I was told a story to-day of a man who had purchased a jack-knife in Berlin for thirty-five cents. He thought it was a pretty good knife at that price, and he went into one of the great department stores in Chicago to make a comparison. He found there the same kind of knife listed at $5.50. That is a rather extravagant case, but there are many cases of what seems to be an almost inexplicable difference in price. I think Germany's ability to do that sort of thing is ceasing. Wages must be adjusted, are being adjusted all the time; the mark has almost fallen to as low a point as it can without vanishing. It can still go, and I think is not unlikely to go, the course of the Austrian crown and the Polish mark; but even that will not take it much further.

Of these falling currencies, Austria and Poland offer the most notable examples; Germany the most significant one because of the size of the country. Hungary, Roumania, and all the Central European nations, have experienced inflation, these deteriorating currencies, this complete upsetting of the whole economic life, these and many other causes, have paralyzed the ability of those countries to trade. They are not producing, at least they are not trading, in anything like the old volume. You have all heard the story of this superficially better situation, but I think you must go beneath that. I think you must analyze the economic and the financial situation. The financial situation governs.

It is possible to have, for a time at least, a certain amount of individual prosperity when the Government's finances are in a bad way. Government finances throughout Europe are in a very bad way and in a progressively deteriorating situation. That is not universally true, but it is true that in many of the countries the financial situation is progressively deteriorating. The increase of debt since the Armistice is one of the amazing facts of European finance.

France has added to her debt since the Armistice nearly half as much as she added during the war. Italy has added 25 000 000 000 or 30 000 000 000

lire to her debt since the Armistice. The increase of debt in Germany has been colossal, whereas the increase in Austria and in Poland has not been so great, except in the increase in currency; but that is true only because those Governments had not the credit to create a debt. They have created currency in an endlessly flowing stream. Poland in 1921 had Government expenses of about 111 000 000 000 Polish marks, while her income from taxation was 10 000 000 000. It is no wonder that a nation with such a gap in its budget, finding no way to close that gap but to print more paper, proceeds into what is very close to National bankruptcy.

If that is the financial picture of Europe, and it is, what is to be the outcome? Some of you will say that you doubt if this is really the picture. Some of you might answer "Oh, I read to-night that France had made a further large reduction of her debt to the Bank of France, and I read a few days ago that France was balancing her budget." Well, if you did, both those things are qualifiedly true. France balances a budget that she calls her ordinary budget, and then she has another budget quite as large that she calls an extraordinary budget, and she hopes for reimbursement for the expenditures under that from the German indemnity; but, in the meantime, she increases her debt; she has increased it until she has now 65 000 000 000 francs of floating debt, unfunded debt, short-term treasury notes. She is committed to spend 60 000 000 000 more on reparations within the next three years. She has hoped to get that back from Germany's indemnity; and it is easy to see why she is so strenuous on the point of insisting that Germany pay according to the terms of the London Conference. Germany, however, cannot pay according to those terms. They are impossible of execution, and so France piles up a debt. She says she has balanced her budget; but if you compare her debt figures, they are steadily and rapidly growing.

The same thing is true of Italy, but she is coming nearer balancing her budget, however. Italy, of all the countries in Europe, is showing the greatest courage about taxation. She is levying taxes and collecting them. All the European nations are levying heavy taxes, but most of them are not collecting them. Italy taxes with great severity. Italy had a deficit two years ago of 14 000 000 000 lire which she is going to reduce this fiscal year to 4 000 000 000. On the other hand, however, Italy is an example of one of those countries that must import. She must import food. She must import every pound of coal. And she has very little of anything to export. She used to balance her foreign trade by tourists spending 1 000 000 000 lire, gold, by her emigrants remitting 1 000 000 000 lire a year; but, to-day, those sources of income have been very much cut down, and she finds her expenditures high and particularly her necessity for imports must be translated into gold, with a result that she is importing about two and one-half times as much as she exports and is really in a ghastly situation so far as her foreign trade is concerned. She seems to me to have done about everything she could in the way of handling her internal fiscal affairs, handling well, too, her internal social affairs.

Here is one of the interesting situations. About a year ago we heard about Italy being Bolshevist, and there was pretty good evidence of it. There were strikes; men took possession of factories, turned out the owners, and declared

that the workmen would run the factories. With the greatest good sense the Government and the owners said, "All right, try it"; and in about a fortnight the men decided that they could not run the factories, and gracefully and fully retired, and turned them back to their owners. If my observation is correct, there is a better relation to-day between labor and capital in Italy then in any other European country. I know that is rather a remarkable statement, and I know that in the face of a situation where they must steadily reduce wages, as they must, that is a statement that may not hold good for a great while, but in the summer and fall of 1921, there were certainly evidences of such a situation.

Speaking of labor conditions, the most interesting labor situation is, of course, in England, where there is still this enormous unemployment—1 600 000 men receiving weekly doles, and some 2 000 000 more on short time; and remember this is out of an industrial population of only 7 000 000 or 8 000 000. I was saying that England is the most illustrious example of a country that has become so industrialized that it must import a vast quantity of food for its people, that England must import food for 30 000 000. You know that tells the story of the strain in the Entente, the strain between England and France.

England cannot live without a restored Europe. England has industrial difficulties at home; but if all those were corrected, she would still be facing the greatest crisis she has ever faced, because of her lack of markets, because of this breakdown in the exchange of goods internationally. England must do everything within her power to rehabilitate the commerce of Europe. She wants to see Germany rehabilitated. Germany was her best customer, and Germany has practically ceased to be a customer. She wants to see—and it is her very life blood—the whole of Europe rehabilitated, and something like the old-time order restored, so that she can again send out into the world her products and get the food that she must have to support her people.

I think the English situation presents one of the most serious in Europe. They will manage it with consummate ability. They will show the greatest common sense all through the whole situation and will grapple it with energy and experience. They will handle it better than any other people on earth could handle it; but, nevertheless, they are facing a crisis that demands the restoration of the economic order of Europe, that demands a restoration of markets. It is a situation that cannot be corrected within England. It must be corrected outside by economic rehabilitation. That is why you find Lloyd-George proposing a General Conference; that is why you find the whole body of English statesmanship centered on reconstruction.

France, on the other hand, is self-supporting, practically self-supporting. Her imports and exports balance. She can feed herself. She is desperately afraid of her bigger neighbor, Germany. She does not know quite what she wants, of two things, as to Germany. For a time she thought she might possibly have both a crushed Germany and an indemnity. She cannot have both. She cannot have, in any event, all the indemnity that she hoped for. The amount of indemnity that was proposed was impossible of payment. I think any judge, any authority outside of France to-day, would agree with that statement. That is pretty much the universal opinion outside of France, that

the full terms of the indemnity as laid, were impossible. France, however, with good reason, fears the economic rehabilitation of Germany, and does not feel either the falsely stimulated exports of Germany as England does now, or the loss of markets that England feels.

So there are two lines of interest that are not parallel, England feeling that her very life depends on the general economic habilitation of Europe, the restoration of the Old World order of trade; France feeling that, first of all, she must have protection and that she must have payment for rehabilitation; and that if she crushes Germany in getting the reparations, she will have done a good job, if she does not crush her too soon to get reparations.

Now, what about it all? How is it coming out? What is to be done? Something of great importance might be done at this Economic Conference at Genoa. Personally, I doubt if there will be, if the main Powers concerned cannot go into that Conference with any program on which they can agree, and there does not seem to be the slightest possibility that they can. The probability of a fortunate outcome of such a Conference is not good; and still I believe the Conference will be of great importance. It will impress all Europe, providing France and Russia both attend. Russia seems quite certain that she will attend; France in some doubt unless the agenda of the Conference is made so as to exclude a great many subjects that really ought to be discussed there. So far as the United States is concerned, we are still hesitating.

I believe that Conference ought to be held and that we should be represented. You may say that this is Europe's affair. She has got into a terrible situation through her own fault. If she is not civilized, if her peoples can not live together, if their selfishness and their blindness and racial antagonisms and their National hatreds are such that they have destroyed the old machinery of an intricate civilization, why they must be cured in spirit, and you may ask what can we do about that? There is some ground for taking that view, because it is back to a regeneration of spirit that you have to go for the fundamental cure of Europe. Do not let anybody make you believe that there is some panacea, some scheme, some formula that could be invented that would cure the European situation. You have to go clear back into the human spirit to cure Europe really and get these people to live more considerately together.

It strikes me that there is a sort of international anarchy in Europe. You have this great number of small nations, this great number of races, these intense antagonisms; each nation believing in its supreme sovereignty, its right to do what it will without regard to its fellows; all these nations governed by no law in regard to their association one with another; and it is quite largely that sort of international anarchy, that National self-consciousness that is making recovery so difficult there.

What could we do at an international, economic conference? What should be our rôle if we were to go there? How could we be helpful? The answers are not easy. In the first place, I suppose it would not be possible to send any group of men who could be said to represent this country, who could commit us to any line of action. It would be impossible to constitute any such group. Therefore, we would be at a disadvantage in a conference at

which other Governments sent representatives who could commit their Governments. We are afraid that we might have to discuss the inter-allied debt, and that would not be a good atmosphere or a good occasion in which to discuss it. I think that is true. It would not be the right place for us to discuss the inter-allied debt. That, however, is something that we ought to discuss, and something we ought to discuss with great promptness, for it is one of the heavy things that is overhanging the European economic situation.

There is one line in which we could come into an international economic conference, and bring to it a great deal of help. I believe that those countries that have deteriorated their currency to the point that the Central European countries have, have to agree on a new form of currency that will not be a Government obligation, or will not be issued by a bank of issue controlled by a Government so that its issues are practically the issues of a Government printing press. Such countries at Poland and Austria and Hungary, and Germany, too, I think, are likely to come to some banking scheme for an issue of currency where the bank will be divorced from the Government and the bank issues divorced from the Government printing press.

I believe it would be possible to organize a bank which would cover many countries of Europe, giving them a reformed currency issued by a bank that was built very much on the lines of our own Federal Reserve banking system. If we were present at such a conference I think we could very sensibly direct the discussion to the rehabilitation of currencies and perhaps the organization of a great world bank in which we might take part.

I am not sure, however, that what we need for such a conference is our wisest bankers or our greatest economists or even our best politicians. Europe needs moral leadership more than she needs material help. I do not believe we can do so very much in the way of material help. We ought to be able to do a great deal in the way of moral leadership.

We have had the experience that no other people ever had of a vast country under one economic organization. I think we could show Europe, we could point to the significance of an economic unity in Europe, to the need of conducting their affairs with less selfishness, to the need of recognizing that the welfare of each country lies in the welfare of all of them. You cannot fix up Europe by fixing up a spot here and there; you have to make a very comprehensive job of it; and it is a job that is really going to take moral leadership to put it in its right light. We ought to be great enough to do that, to be helpful at least in doing that—not to do it, I do not mean that, but to make a helpful contribution. I would like to see the United States take part in the Genoa Conference, and take part with the greatest moral forces that we have. Then, I would like to see here a country that would stand behind the men that are sent. That is where the individual opportunity comes.

One hears these generalities, these incomprehensible figures, hears about these vast economical and political forces, and is apt to fold his hands and say "What can I do in such a situation?" I think, however, we have our individual part to play, in understanding it, in coming to that understanding with a sufficiently fine spirit, so that we begin to form a fine body of public opinion which will be unselfish. If we want to guide toward international

unselfishness the continent of Europe, we must be nationally unselfish ourselves; and we should have an understanding public opinion backed by a fine, generous spirit, if we, as a nation, are to play a great rôle in this moral leadership. We have not made very much progress at it yet; it is a tremendous task; but there is a growing interest. There is some interest that arises from an economic fear. I do not take much stock in that. I am not afraid of the economic future of America, whatever the economic future of Europe may be. I do not mean that we are not tremendously concerned with the economic future of Europe. It would be best for us to live in a well-ordered world, in which we could have a great international trade. It would unquestionably be best; but we are situated as no people ever were situated in all time before, commanding a whole continent with every type of resource, all under one Government, all in one economic unity; and I am convinced that we can have a great share of prosperity within ourselves. Isolation, it is true, would find us with certain plants over-developed. We can manufacture more steel than we can use. We can produce more copper than we can consume. We can raise more cotton than we can as yet weave. It would take some readjustment; but I cannot feel that a country with such resources, could not readjust, will not readjust, and have a great measure of prosperity. So I would not be forced into the European situation by economic fear.

I would not be blind to the economic advantage of a restoration of Europe. It is very great. We ought on that score alone to do all that we can to understand, to participate, and to be helpful; but there is a stronger reason than that. The reason is that we have laid at our feet the moral leadership of the world, and we ought to move to take it up. That means that there must be such gatherings as this, seriously thinking about the problems of Europe, seriously measuring our responsibility, seeing that it is after all in its very fundamentals a spiritual question, that there must be a regeneration of spirit there, and that we ought to meet it and lead it with a spirit of unselfishness, of fairness, of good will. Now, that is not going just to happen. It is going to come out of our inner selves, and it is out of endless audiences of this sort, out of endless numbers of readers who will ponder, understand, and translate into sound, public opinion the best that is in them, that we will make our contribution to Europe.

ITEMS OF INTEREST

This Society is not responsible for any statement made or opinion expressed in its publications.

The Committee on Publications will be glad to receive communications of general interest to the Society, and will consider them for publication in *Proceedings* in "Items of Interest". This is intended to cover letters or suggestions from our membership concerning matters which are not of a technical character. Such communications, however, must not be controversial or commercial.

THE ENGINEERING FOUNDATION

The Engineering Foundation was established in 1914 "for the furtherance of research in science and engineering, or for the advancement in any other manner of the Profession of Engineering and the good of mankind", and for the following purposes: To promote and support worthy researches related to engineering in all its branches; to establish and operate engineering research laboratories, if funds be provided therefor; to co-operate with National Research Council and the Engineering Societies in the stimulation and co-ordination of scientific research.

Endowment Funds Needed.

The Foundation needs a large increase of endowment. It is obliged frequently to refuse to support research projects brought to it because it lacks funds. Gifts of $1 000 or more are desired. Each donor of $250 000 or more will be honored as a Founder. A gift of $50 000 has been offered contingent on the receipt of nine other gifts of $50 000 each. Gifts to the Foundation are exempt from income tax. A gift for research is a productive investment.

The Foundation is compiling a directory of the hydraulic laboratories of the United States, and is planning an investigation of industrial education and training. It undertakes useful researches which do not promise profits sufficient to tempt industrial organizations to undertake them, researches which should be made under disinterested auspices, and researches which lie outside the province of Government bureaus.

The Engineering Foundation is administered under the auspices of the United Engineering Society, the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, by a board of thirteen representatives of these Societies, and three members at large.

A progress report of the Foundation, a form of Deed of Gift, and other information will be sent by the Secretary, Alfred D. Flinn, M. Am. Soc. C. E., 29 West 39th Street, New York City, on request.

Abstract from the Report of the Director of the Advisory Board on Highway Research, Division of Engineering, National Research Council, January 16th, 1922

The following abstract of the report of the Director of the Advisory Board on Highway Research, includes the history of the development of the Advisory Board and its Committees; a report of the activities of the Director; a statement of the financial condition of the Advisory Board; and a survey of the field of highway research.

Chronological Statement

The National Research Council was established in the spring of 1916, when President Wilson requested the National Academy of Sciences to organize the scientific and engineering forces of the United States for the purpose of defense. The Engineering Committee of the National Research Council did effective work during the World War.

The Division of Engineering of the National Research Council occupies offices in the Engineering Societies' Building, 33 West 39th Street, New York City.

Advisory Board.—On October 8th, 1919, Professor A. N. Talbot, Past-President Am. Soc. C. E., and Dean Anson Marston, M. Am. Soc. C. E., representatives of organizations in the Division of Engineering, met in Chicago, Ill., in conjunction with the following:

For the U. S. Bureau of Public Roads:

T. H. MacDonald, Chief;
A. T. Goldbeck, Assoc. M. Am. Soc. C. E., in Charge of Tests and Investigations;
T. W. Allen, M. Am. Soc. C. E., Chief, Division of Control;
J. T. Voshell, M. Am. Soc. C. E., District Engineer.

For the Mississippi Valley State Highway Department Association:

Clifford Older, M. Am. Soc. C. E., President.

After discussing the importance and necessity for the immediate inauguration of a National program for highway research, and listing the highway research agencies, it was recommended in a report dated October 27th, 1919, and signed by Messrs. A. N. Talbot, Anson Marston, H. H. Porter, M. Am. Soc. C. E., and George S. Webster, Past-President, Am. Soc. C. E., that a sub-committee of the Engineering Division be appointed to co-operate with the Chairman in co-ordinating the various highway research committees, and that six committees be constituted as follows:

(1) Committee on the Economic Theory of Highway Improvement:

Purpose.—Determination of all elements of cost of highway transportation (both motor vehicle and animal drawn), and the effect on each cost element of each feature of highway improvement (improved surface, grade reduction, elimination of rise and fall, etc.) to enable reliable and scientific determination of the sums which could be economically expended for scientific highway improvement.

(2) Committee on Structural Design of Roads:

Purpose.—Experimental determination of stresses, strains, and behavior, of impact and abrasion in actual roadways under actual traffic; including also the effect of temperature variations, freezing and thaw-

ing, non-uniform subgrades and other factors; in order to establish reliable scientific engineering theory for the structural design of roads.

(3) Committee on Properties of Road Materials:

Purpose.—To investigate the properties of road materials and their combinations, including devising and standardizing tests.

(4) Committee on Methods of Road Construction.

(5) Committee on Maintenance Methods and Design.

(6) Committee on Highway Bridge and Culvert Research.

On October 26th, 1920, the Chairman of the Engineering Division addressed a communication to the governing boards of certain National organizations, Federal and State departments, and educational institutions, stating the need for highway research, and the projected committee organization, and inviting representatives to a conference on November 11th, 1920, for the purpose of completing the organization.

On November 11th, 1920, an Advisory Board on Highway Research was organized and by-laws were adopted. The officers were Chairman, Vice-Chairman, and Director, and Administrative Committees, Executive, and Ways and Means, and Research Committees on Bibliography, Economic Theory of Highway Improvement, Structural Design of Roads, and Character and Use of Road Materials, were created.

The purposes of the Board are, briefly: To prepare a comprehensive National program for highway research; to assist existing organizations to co-ordinate their activities therein; and to collect and distribute information of completed and current research.

On July 11th, 1921, the Executive Committee met and engaged a Director; authorized the Chairman and Vice-Chairman to prepare co-operative agreements with the Bureau of Public Roads, State Highway Departments, and other suitable organizations for instituting and co-ordinating a National program for highway research.

Members of Advisory Board.—The following are the officers and constituent members as of the date of this report:

Officers:

Chairman, Anson Marston, M. Am. Soc. C. E., Member, Iowa Highway Commission.

Vice-Chairman, Alfred D. Flinn, M. Am. Soc. C. E., Secretary, Engineering Foundation; Chairman, Division of Engineering National Research Council.

Director, W. K. Hatt, M. Am. Soc. C. E.

Other Members of Executive Committee:

Thomas H. MacDonald, Chief, Bureau of Public Roads.
George S. Webster, Past-President, Am. Soc. C. E.
Henry M. Crane, Society of Automotive Engineers.

Member Organizations:

American Society of Civil Engineers;
American Association of State Highway Officials;
American Concrete Institute;
American Institute of Consulting Engineers;
American Society of Mechanical Engineers;
American Society for Municipal Improvements;
American Society for Testing Materials;
Association of American State Geologists;
Bureau of Public Roads, U. S. Department of Agriculture;
Corps of Engineers, U. S. Army;

Engineering Foundation;
National Automobile Chamber of Commerce;
National Highway Traffic Association;
Society of Automotive Engineers.

Activities of the Director

In addition to conferences held in many States, with the object of organizing the work, the Director, as a representative of the Research Council, participated in the work of the group called together by Herbert Hoover, M. Am. Soc. C. E., Secretary of Commerce, to report on the letting of contracts for road building in the fall.*

Publicity.—Several papers have been presented before engineering bodies and Highway Conferences in the interest of Highway Research and future engagements include many important Highway Conferences to be held during 1922.

Washington Office.—The work at Washington, D. C., has been mainly directed to making contact with various organizations the activities of which touch the work of the Advisory Board, and in studying the useful field of the activities of the office of the Director.

Public Support

The project of the Advisory Board has been received favorably by the public, not only by highway engineers, but also by vehicle interests. Copies of the paper on "Program of Highway Research", presented before the Economic Conference, at the University of Maryland, on July 27th, 1921, was sent to the State highway officials, and gratifying expressions of interest and approval have been received.

Finances

The financial support of the Advisory Board is as follows:

The Research Council	$ 500
Engineering Foundation	1 000
Department of Agriculture through contract	12 000
(In service from the Bureau of Public Roads, stenographic assistance, and recent assignment of half-time engineer for preparation of census of research.)	
Connecticut Highway Department	1 000
Total	$14 500

Additional support is expected from several highway commissions.

Liabilities:

Salaries	$10 000
Travel expense (estimated)	2 500
Stationery, postage	500
Total	$13 000

A Survey of the Field of Research

Relation of Highway to Other Transport.—Freight is finding its way through new channels. Of the freight between Bakersfield and Los Angeles, Calif., 63% is carried over the well known Ridge Highway at 16 cents per ton-mile, rather than by the Southern Pacific Highway at 5 cents per ton-mile.

* *Proceedings*, Am. Soc. C. E., November, 1921, p. 873.

For the purpose of a view of the entire traffic situation and for a wise State and National policy, traffic studies are of special importance.

It is therefore necessary that the data underlying the economic disposition of traffic among the various agencies of transportation be obtained by trained research workers. Only in this way can one obtain an overhead view of the relation of highway transport to other existing agencies.

Economics.—There is an important service to be rendered by the highway engineer in locating his road so that the cost of operation will be reduced, these costs including charges, depreciation, replacement, maintenance of vehicle and road, etc. It is hoped that, within the course of a year, the cost of operation of vehicles, as determined by location and character of highways, will be fairly well determined. Professor T. R. Agg, M. Am. Soc. C. E., has accumulated a large amount of carefully determined data in connection with the work of the Experiment Station of the Iowa State College, and he is also directing work in New England, in which Harvard University, Yale University, Massachusetts Institute of Technology, Bureau of Public Roads, United States Army, Society of Automotive Engineers, and the highway commissions of Massachusetts and Connecticut are co-operating.

Professor N. W. Dougherty, Assoc. M. Am. Soc. C. E., of the University of Tennessee, has shown the value of a well planned program of regional studies of traffic. Here is an excellent field for local studies by universities.

Present traffic conditions should be studied and those in the near future must be envisaged before an intelligent program can be framed for the development of any region. In many cases, this policy involves the provision of permanent structures, location, and grading, to be used without paving until such time as the development of the country and the increased traffic justifies the paving of this roadbed. Instances are not wanting, however, in which the absence of paving under heavy traffic has brought about heavier costs, and a road impossible to maintain satisfactorily. Questions of the length of life of bonds for various types of roads and of the proportion of costs to be provided for by bonds and by current fees, can only be decided on the basis of physical facts and costs which, at present, are wanting.

Traffic Studies.—There is a live interest in traffic studies which have been planned in a number of States. The purpose, methods, and devices for measuring traffic are yet to be agreed on. Something more than the count of vehicles is necessary. The proportion of truck traffic and the weight of the vehicles should be known, in order that some estimate may be made of the proportion of the maintenance costs chargeable to truck traffic. One of the most complete traffic studies is that now under way in the State of Connecticut, in which not only the mechanical features of the traffic, but the commodity value, the origin, and destination are recorded. A study of the laws of development of traffic is now almost complete under the direction of Dean A. N. Johnson, M. Am. Soc. C. E., of the University of Maryland.

Such traffic studies are an important part of the economies of highway transport to which main question others are subsidiary. This cost arises from the road and the vehicle. It has been estimated that $12 are spent on the vehicle each year where $1 is spent on the road.

The most important sources of information on traffic are the States of Connecticut under Charles J. Bennett, M. Am. Soc. C. E., the State of Maryland under the direction of Dean A. N. Johnson, the State of Iowa under Professor Agg, the State of Minnesota under Mr. J. H. Mullen, and the information gathered during the recent studies of highways in California by the U. S. Bureau of Public Roads.

Operation.—The control of traffic, especially with reference to safety, is a paramount issue. A striking suggestion by Mr. J. H. Mullen, Chief Engineer of the Highway Department of the State of Minnesota, is that the speed on heavy passenger lines be limited to 40 miles per hour at the maximum and 25

miles per hour as a minimum between the hours of 8 A. M. and 8 P. M. This will force the truck traffic to the use of the roads in the night. The art of signaling highways needs study, and the recent paper by Mr. A. R. Hirst, of the State of Wisconsin, indicates the growing importance of this part of the operating field.

The control of public carriers using the highways through the fixing of rates and the regulation of service, seems to have been put in the hands of the public service commissions rather than highway commissions. The operating department in some States has snow removal problems equivalent to those of the railways.

Maintenance.—Maintenance costs, one of the most important elements entering into the economics of highway construction, have in the past not been properly determined and allocated. The choice of the type of road depends greatly on such data. Something more is needed than a total cost of maintenance from fence-to-fence or from shoulder-to-shoulder. The cost arising from the surface itself should be known, and whether this was a replacement or the result of a misfit of the type to traffic conditions. The U. S. Bureau of Public Roads will require a report on maintenance costs on all Federal Aid projects, according to a standardized system of accounting. In the course of time, reliable maintenance data may be secured. In the meantime, much can be learned from specific cases, particularly in those counties where foresighted individuals have properly analyzed maintenance costs.

A great deal of experimentation and research is needed to fix on the correct theory of maintenance of the various classes of roads.

Legislation.—Restrictive legislation on the weight of the vehicle should be based on a careful survey of existing conditions. A truck should go over State boundaries on main routes without being forced to reduce its load. It is said that only one-half of 1% of the traffic on the highways is in the form of vehicles over 5 tons in gross load. The data of research into highway economics are necessary for wise legislation.

Design of Road.—In the field of design the engineers are in a more favorable position. The main problem of research lies in the field of the load, the mechanical action of rigid and non-rigid slabs, and the properties of the subgrade.

Sub-Grade.—The design of the road should be related in some manner to the supporting power of the soil. A large volume of research is directed to the study of sub-soils and, particularly, to determine that element of the soil which determines its properties and to the treatment of sub-soils by drainage and the admixture of chemical additions. The most important agencies in this field are the U. S. Bureau of Public Roads, the Sub-Soil Committee under the chairmanship of Gen. E. I. Dupont, organized first as a committee of the now inactive Federal Highway Council, the work by Professor F. H. Eno, M. Am. Soc. C. E., of the Ohio State University, by Mr. Clifford Older, of the Illinois State Highway Department, and by the University of California. These researches include the mechanical and ultimate analysis of soils, instruments for determining bearing power and study of water movement and consequent volume changes. Studies are also under way in the U. S. Bureau of Public Roads for the protection of the shoulders and other means to preserve the moisture content of the sub-soil more uniformly. In California, the soil is improved by mixing in coarse aggregate. In some States a layer of tarred paper is placed on the sub-soil to prevent the entrance and egress of water which it is thought results in harmful volume changes of the concrete slab. When the studies under way are complete there should be within the year a fairly satisfactory account of the action of sub-soils, the means of testing them, and the implication which the data carry into the field of design. It is Mr. Older's observation that in the case of the soils of Illinois there is practically no supporting power under expected conditions, and that, therefore, the con-

crete slab must be designed as an overhanging cantilever with the load at the corner of the slab. The U. S. Bureau of Public Roads has treated some sub-soils by the admixture of additional materials, such as Portland cement, which apparently renders a plastic clay granular in its nature and destroys the plasticity. Experiments are under way by the California State Commission on treating adobe sub-soils.

Slab.—The width of surfacing is closely related to the findings of traffic studies and the habits of drivers. Multiples of 10 ft. are advocated by some. The Committee on Standards of the American Association of State Highway Officials will be the source of authority on questions of this kind.

As concerns the design of stiff slabs under a specified loading, there is an interesting field of scientific experimentation on a large scale. Some of the experimental roads may be listed as follows:

(1) The Bates Experimental Road, 2 miles long, built by the Illinois Highway Commission under the direction of Mr. Clifford Older, contains brick surface on concrete slabs of various mixtures and differently reinforced.

(2) A test road, 1 500 ft. long, oval in shape, built by the Columbia Steel Company, at Pittsburg, Calif., under the engineering direction of Messrs. Leonard and Aldrich, of San Francisco, and with the co-operation of the U. S. Bureau of Public Roads and the California Highway Commission. Contributions have been made by California automobile clubs. The construction includes concrete slabs of various thickness and shape, some with inverted curbs and variously reinforced, the steel varying from 20 to 69 tons per mile. This road was built in July, 1921, and first loaded November 9th, 1921, with 40 trucks, equivalent to the passage of 10 000 trucks per day. The sub-grade is adobe soil. Complete provision has been made for measuring volume changes due to temperature and for sub-soil moisture, and other pertinent data. Four tunnels, covered with 3½ ft. of rolled sub-grade, run transversely to the road. In these tunnels there is an autographic record of the deflections of the slab and the sub-grade due to the passage of traffic. The mechanical action of the slabs are determined by various positions of the truck under static and impact conditions.

(3) A reinforced concrete pre-cast slab road, in desert, built in 1920, at Casper, Wyo., is 2 400 ft. long. The units are 8 ft. long, 9 ft. wide, and 6 in. thick.

(4) An experimental concrete highway, 2 miles long, is under construction in Alexandria County, Virginia, under the direction of the U. S. Bureau of Public Roads. The sections of this highway are of various thicknesses and shapes, with various reinforcement. Preliminary scientific measurements have been made. This highway is subjected to normal farm traffic.

(5) An experimental road, of circular track, concrete base, and bituminous top, has been constructed by the U. S. Bureau of Public Roads at the Experiment Farm, Virginia. Various combinations of bituminous tops are to be tested under the action of a truck which is guided automatically.

Several roads have been built which contain variations in aggregate or reinforcing, as part of State systems, the data and description of which are not at present available.

There are also the remarkable investigations conducted by the U. S. Bureau of Public Roads, under Mr. A. T. Goldbeck, at the Experimental Farm near Washington, D. C.

When specimen tests are combined with service tests, the road designer should be in the near future in possession of data comparable to that at the disposal of designers of concrete buildings. It would seem that with the large mass of data that has been gathered and analyzed, the designer should be able to design a road slab with the certainty that he designs any other structure. The enterprise of the Columbia Steel Company, at Pittsburg,

Calif., should be encouraged and this Pittsburg road be continued with new sections.

Reinforced Roads.—The last word has not yet been said on the policy of reinforcing concrete roads. One extreme is a thick, heavy slab, massive enough to withstand such loads as are found in the State of Washington, namely, 20 tons of logs; the other extreme is a thin flexible slab which will deform under a load or under the action of frost and be brought back to its primitive shape by the elasticity of the reinforcing steel. No doubt, the adjustment in this respect would be determined by the condition of supply of materials and by a comparison of the maintenance costs of heavy concrete roads and thinner reinforced roads. Those who are designing experimental roads should have this element of research in mind. The reinforcement now generally used is only sufficient to hold together the broken sections of the concrete slab. Research is needed to determine the reinforcement which will be really effective under the various regional conditions of the United States.

Other Types.—In the rapid development of other types of roads, the experimental study of brick roads has been somewhat neglected, and the efforts of the National Association of Paving Brick Manufacturers to promote research comparable to that now being applied to other types of construction, should be welcomed.

Relation of Vehicle to Road.—Restrictive legislation on truck loads may result in a re-design of vehicles with new tire equipment or new relations of spring-borne and unsprung weight or multiple axles to carry maximum loads over highways with less destruction of the road. The recently proposed committee composed of representatives of the Society of Automotive Engineers and the Highway Engineers will consider the mutual relations of the vehicle to the road. The highway engineer also, with the automotive engineer, must conduct research into the effect of the various road surfaces on the operating cost, including gasoline consumption and tire wear, and the operating departments must also consider the road surface and alignment in relation to the statistics of accidents. Roads must also be evaluated from the standpoint of tractive effort and safety.

Construction.—One of the outstanding problems in the construction field, in the sub-division of materials, is the cause of surface waving, both in gravel and bituminous roads. Whether these surface waves or corrugations arise from methods of construction or maintenance, or from a lack of homogeneity in the materials, or lack of proper balance of filler and bituminous content, they certainly have come through the action of high-speed motor traffic. Whether this traffic operates to produce these waves by reason of spring action or engine impulse or otherwise is to be determined. The cost arising from this action is excessive. Research is needed to determine the cause and remedy. H. S. Mattimore, Assoc. M. Am. Soc. C. E., of the Pennsylvania State Highway Department, and Maj. F. S. Besson, of the District of Columbia, are active in research on the cause of waves in asphalt surfaces. The U. S. Bureau of Public Roads is making a special study of the corrugations of gravel roads, and is co-operating with the Asphalt Association in studying the causes of waving of asphalt pavements. A large number of samples have been secured from Washington, D. C., Baltimore, Md., New York City, Philadelphia, Pa., and Detroit, Mich.

A research into the efficiency of the operations of concrete mixers is much needed and also a further study of the product of central mixing plants.

The field of research on the fundamental principles of materials and on standardization of tests has been occupied for a great many years. These researches are well fitted to the ordinary university laboratory and are numerous. Perhaps special mention may be made of the following without doing injustice to the large number of devoted and able experimenters.

The work of Professor Duff A. Abrams, M. Am. Soc. C. E., of the Lewis Institute, Chicago, Ill., has made it now possible for expert testing engineers to duplicate tests of concrete cylinders in the laboratory with very close agreement. However, field tests of concrete cylinders scatter very widely even when they are made with great care by trained operators. At present, it may be asked if field tests of concrete cylinders in compression are indices of the concrete in the road. Are such tests a suitable basis for contractual relations? The practice of cutting cores from the hardened concrete roads is common, and although the returns are not sufficient to allow judgment, it does not appear at the present time that these cores are more uniform than the cylinders cast during the period of construction. The work of the Pennsylvania Highway Commission, the Illinois Highway Commission, the University of Illinois, and the Maryland Highway Commission, when brought together, will no doubt throw light on this vexing question.

A survey of supplies of road materials by which bidders on highway construction may know the available sources of acceptable material, quarry conditions, and freight rates, such as are conducted by Mr. H. S. Mattimore, of the Pennsylvania State Commission, result in an easily computable saving of money to the States. R. W. Crum, M. Am. Soc. C. E., Testing Engineer of the Iowa Highway Commission, and Professor M. O. Withey, of the University of Wisconsin, and the Purdue University Laboratory have given special attention to the use of available aggregates. The Kansas State Agricultural College and the Texas Highway Commission are both active in the field of development of materials of construction. The work of Mr. W. L. Schwalbe, in the study of consistency, at the University of Illinois, is likely to prove of great value. At Purdue University, a survey of road materials in the State is under way, and also studies of the test for surface hardness of concrete and the ability of plain concrete to undergo reversal stresses.

A little later, the Research Council expects to issue the results of a Census of Research in which the many valuable studies under way in the Experiment Stations of the various State universities will be listed and described. It is difficult to mention a few of these investigations in a paper of this kind without doing injustice to the large number of devoted research workers.

Research on structures, such as highway bridges, can only be mentioned, because the limits of space have already been exceeded.

Future Activities of the Director

During the past few months, the Director's activities have been personal, in education and promotion and in publicity. The assistance available in the U. S. Bureau of Public Roads probably will permit the Director to organize his office to some extent, to build up a permanent filing system, and to inaugurate the Census of Research and the Research Information Service. Research bulletins will be prepared. He will continue his visits to the highway commissions and to the universities to stimulate, co-ordinate, and find support for the research efforts of individuals. He will continue to keep in close touch with the activities of organizations that work in allied fields.

Activities of American Engineering Standards Committee

International Co-operation in Standardization

The American Engineering Standards Committee has just completed arrangements by which co-operation with the standardizing bodies in other countries will be made more effective. In doing this it has followed out the recommendations of the Unofficial Conference of the Secretaries of the National Standardizing Bodies held in London, England, in April, 1921.

In order that all standards shall be available to the industries of the various countries, it is planned that each National body will sell the approved standards of the other bodies. The American Engineering Standards Committee, at Engineering Societies Building, 29 West 39th Street, New York City, has available the publications of the standardizing bodies in Austria, Belgium, Canada, France, Germany, Great Britain, Holland, Sweden, and Switzerland.

Hereafter, the American Engineering Standards Committee will regularly exchange information with the foreign bodies as to the status of work on the various projects being undertaken under its auspices. This information will be limited to the indication of the stage of development of the projects, it being left in each case to the various sectional committees and sponsor bodies to decide to what extent they desire to exchange technical memoranda or drafts of standards. This exchange of information on the general progress of the work will, however, lay the basis for closer international co-operation as the need for this develops in special instances.

National Standardizing Bodies Organized in Japan and Norway

Standardization work in Japan has recently been given a great impetus by the organization of the Japanese Engineering Standards Committee. The main function of this Committee is to serve as a bureau for solving and initiating problems involving engineering standardization. The Committee consists of 70 members presided over by the Minister of the Department of Agriculture and Commerce acting as President, and a Vice-President, who is elected or appointed. The details of the work are handled by seven secretaries who are engineers of the Government Departments of Agriculture and Commerce, Communications, Railways, Military Engineers, and Naval Engineers. The work is being pushed with vigor, investigations already being under way on metals, woods, bricks, screws, electric wires, and electric motors.

In Norway, a National Standardization Committee has been organized by the Federation of Norwegian Industries. One of the first projects which is being taken up by the new Committee, after the necessary work on organizational problems, is the standardization of ship machinery and ship details.

There are now National standardizing bodies in the following fourteen countries: Austria, Belgium, Canada, Czechoslovakia, France, Germany, Great Britain, Holland, Italy, Japan, Norway, Sweden, Switzerland, and the United States.

American Engineering Standards Committee Approves Four Specifications

The American Engineering Standards Committee has approved as Tentative American Standard, the specifications of the American Society for Testing Materials for:

Cold-Drawn Bessemer Steel Automatic Screw Stock (A32-14).
Cold-Drawn Open-Hearth Steel Automatic Screw Stock (A54-15).
Methods of Chemical Analysis of Manganese Bronze (B27-19).
Methods of Chemical Analysis of Gun Metal (B28-19).

These specifications may be found in the 1921 volume of the American Society for Testing Materials Standards. Copies may also be obtained from the American Engineering Standards Committee, for 25 cents each.

American Railway Association and Steel Manufacturers Join American Engineering Standards Committee

Beginning with 1922, the American Railway Association (Engineering Division) and the Association of American Steel Manufacturers became member bodies of the American Engineering Standards Committee.

The Association of American Steel Manufacturers is an organization of forty iron and steel manufacturing companies. Its activities are limited to the standardization of rolling-mill practices and to the standardization and inspection of iron and steel products. The Association was organized in 1895. Its official representative on the American Engineering Standards Committee has not yet been designated.

The American Railway Association which speaks for practically all the steam railways of the United States, has four great technical branches, each having its own secretary, the Engineering and the Mechanical Divisions, and the Signal and the Telephone and Telegraph Sections. The Engineering Division which is intimately connected with the American Railway Engineering Association, the two organizations having the same officers, covers broadly the civil engineering activities of the railways. The standardization work in which the two associations are engaged, and which they have accomplished, is very extensive, both in scope and in amount. E. A. Frink, M. Am. Soc. C. E., of the Seaboard Air Line Railway, who is Chairman of the Standardization Committees of the two Associations, represents the American Railway Association (Engineering Division) on the American Engineering Standards Committee.

These two new member bodies bring the total number of National organizations represented on the American Engineering Standards Committee up to twenty-eight, and of representatives to fifty-two.

ACTIVITIES OF LOCAL SECTIONS*

Regular Meeting of the Colorado Section

The regular meeting of the Colorado Section was called to order at the Metropole Hotel, Denver, Colo., on January 9th, 1922; President A. N. Miller in the chair; Walter L. Drager, Secretary; and present, also, 9 members and 1 guest.

No quorum being present, the reading of the minutes and the transaction of business of the Section was postponed until the next regular meeting.

The Secretary presented correspondence from Engineering Council relative to the proposed bill in Congress, providing for the compulsory adoption of the Metric System, and the subject was discussed by those present.

An outline of the work of the Engineers' Building Committee appointed by Engineering Council was presented by the Secretary and was followed by considerable discussion.

Mr. James Munn addressed the meeting on "Progress at the Boulder Canyon Dam Site", describing the difficulties encountered by the engineers in drilling the foundation now in progress on the Colorado River.

Regular Meetings of Duluth Section

A meeting of the Duluth Section was called to order on November 21st, 1921, at 12:15 P. M.; President John L. Pickles in the chair; W. G. Zimmermann, Secretary; and present, also, 22 members and 3 guests.

The minutes of the October meeting were read and approved.

The Secretary presented letters from the Los Angeles Section and from the Secretary of the Service Engineers Committee at Washington, D. C., relative to the bill providing a commissioned status to sanitary engineers in the U. S. Public Health Service. After a brief discussion, it was decided, on motion, duly seconded, to appoint a committee of three to draft a resolution regarding this matter similar to that recently passed by the Los Angeles Section. Messrs. Coe, Darling, and McCool were appointed as such committee.

A paper by Maj. E. H. Marks, Corps of Engineers, U. S. A., on "Aerial Photography", was presented by the author.

Mr. W. H. Crego, Mining Engineer, also gave an informal talk on his experiences in exploration work at copper mines in the Belgian Congo, and a brief address on "Graphite and the Manufacture of Pencils" was delivered by Mr. J. E. Simpson, of the Joseph Dixon Crucible Company.

Meeting of December 19th, 1921

A meeting of the Duluth Section was called to order on December 19th, 1921, at 12:15 P. M.; President John L. Pickles in the chair; W. G. Zimmermann, Secretary; and present, also, 20 members and 1 guest.

The minutes of the meeting of November 21st, 1921, were read and approved.

The Secretary presented a number of letters in acknowledgment of the resolution adopted by the Section at its November meeting pertaining to

* For list of Local Sections, Officers, etc., see p. 175.

the matter of providing a commissioned status to sanitary engineers in the U. S. Public Health Service, which resolution had been sent to the United States Senators and Representatives from Minnesota.

A Symposium on "The Good of the Order" was opened by Messrs. Coe and Kelly, who were followed by a number of those present. The discussion which related to the best way of handling the meetings of the Section, and to its relation to Society matters in general, brought out the opinion that although some routine matters could be curtailed, any time spent on matters relating to the Society should be considered as time well spent, and that the Section should take a more active part in Society affairs by offering papers and discussions on engineering subjects for Society publication.

On motion, duly seconded, it was directed that arrangements be made to send an authorized representative of the Section to the Annual Meeting of the Society on January 18th, 19th, and 20th, 1922, in New York City.

Meeting of January 16th, 1922

A meeting of the Duluth Section was called to order on January 16th, 1922, at 12:15 P. M.; President John L. Pickles in the chair; W. G. Zimmermann, Secretary; and present, also, 22 members.

The minutes of the meeting of December 19th, 1921, were read and approved.

President Pickles stated that in compliance with the resolution at the December meeting, the Board of Directors had appointed Mr. O. H. Dickerson to represent the Section at the Annual Meeting of the Society in New York City.

Mr. W. H. Hoyt made a detailed and interesting report of the meeting of the Council of Federated American Engineering Societies at Washington, D. C.

A progress report from the Committee on City Planning in Duluth was presented by Mr. Coe.

Mr. N. B. Patton gave a brief address on the record and chart recently prepared by him bearing on temperatures and rainfall in Duluth during the past fifty years. The subject was discussed, and Mr. Patton's offer to present the whole matter in more detail at a later meeting was, on motion, duly seconded, unanimously accepted.

Mr. F. Hutchinson delivered an interesting address relative to his recent trip to South Manchuria, telling of the iron and coal deposits there and the proposed methods of mining them. On motion, duly seconded, Mr. Hutchinson was requested to continue the talk at some future meeting, and illustrate his remarks with lantern slides.

Meeting of Los Angeles Section

A regular meeting of the Los Angeles Section was held at the City Club, on January 11th, 1922; President R. J. Reed in the chair; F. G. Dessery, Secretary; and present, also, 48 members and 28 guests.

The President announced the appointment of the following Standing Committees: Program, City Planning, California Engineering Council, Public

Library, City Traffic Problems, Los Angeles County Regional Planning Conference, Representatives on Joint Technical Society, Sub-Structures in Coastal Waters, State Industrial Accident Commission, and Sewer.

Mr. H. Hawgood called attention to the meeting, at Pasadena, Calif., on January 16th, 1922, of the Consulting Board of the State Water Commission, outlining the work of the Commission and the necessity of co-operation in securing first-hand data on State water resources. On motion, duly seconded, President Reed appointed the following committee to represent the Los Angeles Section at this meeting: Messrs. A. L. Sonderegger, L. C. Hill, H. W. Dennis, S. B. Morris, and K. Q. Volk.

The meeting was addressed by J. A. Griffin, City Engineer of Los Angeles, who pointed out the necessity of immediate relief in regard to the sewage problem, illustrating his remarks with a number of photographs of the flooding of parts of the city with sewage during recent storms.

The speaker of the evening, Mr. Halbert P. Gillette, Editor of *Engineering and Contracting,* addressed the meeting on "The Engineer as a Political Economist", and at the conclusion of his address Mr. Gillette was given a rising vote of thanks.

Annual Meeting of the Nebraska Section

The Annual Meeting of the Nebraska Section was called to order at 4 P. M., on January 14th, 1922, at the Chamber of Commerce Building, Lincoln, Nebr.; President Rodman M. Brown in the chair; Homer V. Knouse, Secretary; and present, also, 19 members.

The minutes of the Thirty-ninth regular meeting were read and approved.

President Brown appointed the Tellers to canvass the ballot for Officers for 1922, and the Committee reported the following elections: President, William Grant; Senior Vice-President, George T. Prince; Junior Vice-President, H. H. Tracy; and Secretary-Treasurer, Homer V. Knouse.

The Secretary called attention to articles in recent issues of the *Omaha World-Herald,* in which attacks were made on the work of the Federal Bureau of Public Roads and the Department of Public Works of Nebraska, and to the unfairness of the statements made therein. After some discussion, on motion, duly seconded, the President was instructed to appoint a Committee on Resolutions. During the discussion of this motion, it was brought out that it was the feeling of the meeting that the resolutions should condemn the practice of taking the unsupported word of untrained and prejudiced observers in attacks on professional engineers.

Mr. W. H. Campen presented for discussion the question of standard specifications for municipal and State work as applied to the building of highways, and the subject was discussed at some length.

The character of programs for future meetings of the Section was also discussed, and without formal action it was agreed that at future meetings, if possible, papers should be presented by members of the Section, as well as addresses or papers by members of the Society or others not local residents.

The Treasurer presented his Annual Report.

The Committee on Resolutions presented a report which was generally discussed, and, on motion, duly seconded, referred to a later session for further action.

After an adjournment for dinner, the meeting was called to order at 8 P. M., at the Grand Hotel; President Brown in the chair; Homer V. Knouse, Secretary; and present, also, 22 members and 3 guests.

President Brown presented the Annual Address, his subject being "The Builder".

Mr. W. E. Hardy, a member of the State Capitol Commission, presented an address on "The New Capitol Building", following which a vote of thanks was extended to him.

The report of the Committee on Resolutions was presented for consideration and, on motion, duly seconded, was adopted.

President-elect Grant was escorted to the chair and addressed the meeting on the work of the Section. He also announced that the Entertainment Committee, Messrs. Letton, Green, and Bates, would be continued to arrange for the February meeting, and in this connection Mr. Letton stated that the February meeting would be addressed by Mr. E. S. Jarrett, who would describe the design of the foundations of the new State Capitol.

On motion, duly seconded, the President was instructed to appoint a committee of five to make recommendations in regard to standardizing specifications and to conduct such investigations as were deemed necessary.

R. E. Edgecomb, Chief Engineer of the Building Department of the City of Omaha, announced that the final preliminary draft of the new Building Code for the City of Omaha would be issued shortly, and requested the President to appoint a committee of the Section to review the proposed Code and make recommendations. The President subsequently appointed Messrs. Latenser, Vogel, and Bruce as such committee.

New York Section Considers Methods of Traffic Handling

The second regular meeting of the New York Section, which was held on January 11th, 1922, in the Engineering Societies Building, considered the subject "Traffic Handling—Its Engineering as Well as Regulatory Aspects"; President Nelson P. Lewis in the chair; J. P. J. Williams, Secretary; and present, also, about 95 members and guests.

The reading of the minutes of the previous meeting was dispensed with, on motion, duly seconded, and carried.

The Secretary announced the results of the questionnaire in regard to holding sub-section group meetings supplementary to the regular monthly meetings, to discuss technical problems in various fields, and read the names of 42 applicants for membership in the Section, obtained as a result of the appeal issued by the Membership Committee.

The subject of the evening was introduced by Messrs. Amos Schaeffer, Consulting Engineer to the President of the Borough of Manhattan, and E. P. Goodrich, Consulting Engineer, New York City, and was discussed by Messrs. Robert Grier Cooke, President of the Fifth Avenue Association; John

F. O'Brien, Inspector, New York Police Department, representing Dr. John A. Harriss, Special Deputy Commissioner of Police in charge of traffic regulation, who was unable to be present; Clifford M. Holland, Chief Engineer, New York State Bridge and Tunnel Commission and New Jersey Interstate Bridge and Tunnel Commission; A. T. Warner, Traffic Engineer, Public Service Railway Company, Newark, N. J.; D. L. Turner, and John P. Fox, Secretary of the Murray Hill Association.

Mr. Schaeffer presented the engineering aspects of the subject, giving results of traffic counts to indicate the seriousness of the problem at certain congested points in New York City. He stated that the opening of the Park Avenue Viaduct, cited as a striking example of how engineering can be applied to the solution of problems of traffic congestion, had resulted in a decrease in the traffic passing 42d Street on Fifth Avenue, a decrease of about 18% in the traffic on Madison Avenue, and an increase of 168% in the traffic on Park Avenue between 34th and 35th streets. These figures were based, he said, on traffic counts before and about six months after the Viaduct was opened, the traffic on the latter being then 2 098 vehicles at the maximum hourly count, or 8.74 per lane of traffic per minute—the greatest intensity found on any of the thoroughfares under consideration. He considered this a most successful method of relieving congestion, and stated that plans were made to improve it still further by opening Depew Place on the easterly side of the Grand Central Station.

Mr. Schaeffer described the plans made to eliminate the grade crossing at 42d Street and Fifth Avenue, and the proposed underground sidewalks to extend from Grand Central Station to a point west of Fifth Avenue. He discussed in detail the difficulties of the problem of handling the traffic to be poured into a congested district when the new Vehicular Tunnel is completed. He stated that the City had been widening roadways when congested streets are repaved, and also replacing the 6-ft. curves at curb intersections by 12-ft. curves, and concluded by describing the waste of roadway space caused by elevated railway columns and the effects of granite block *versus* sheet asphalt pavements.

Mr. Cooke discussed the traffic problem of Fifth Avenue from the viewpoint of the merchant, and stated that it was through Dr. Harriss that the suggestion of a signaling system first proposed nine years ago by the Fifth Avenue Association was put into operation. This system of simultaneous movement by blocks controlled by lights had increased the vehicular traffic by 75%, he said, and had demonstrated its efficiency by actual test. He felt that it would soon be necessary to limit the kind of vehicles on the Avenue still further, and probably reduce the number of buses. He stated that there had been placed before the Board of Aldermen by the Association an ordinance which practically prohibits parades, except when business houses are closed.

Mr. Goodrich showed a working model and illustrated the possibilities of obtaining continuous movement by a "platoon system" of control of traffic movement, by which he claimed that double the present efficiency could be obtained. This system, he pointed out, would have the advantage over the present system in that it would not stop and start the lanes of moving vehicles,

but would keep them moving continuously in groups, separated by a time interval on both north and south and east and west streets, all to be regulated by an electrically controlled semaphore system. He also emphasized the advisability of such mechanical control for the present system, and stressed the need for greater restrictions in regard to parking and unloading at the curb.

Inspector O'Brien described briefly the growth of traffic regulation by the Police Department since its inception in 1903, until, at the present time, there are 1 547 men in the traffic squad. He advocated the elimination of the left-hand turn, and pointed out the difficulties in carrying out any such theoretical plan as that proposed by Mr. Goodrich. He said it was planned to extend the light system of control to parts of the Bronx, the Grand Concourse, and Bedford Avenue, Brooklyn, and described the method of controlling and diverting theater traffic in the Times Square District.

Mr. Holland explained the economic requirements which limited the width of roadway in the new Vehicular Tunnel, and described the plans for a wrecking crew to remove immediately any obstructing vehicle stalled in the tunnel. He cited figures on traffic intensity on the Manhattan Bridge, showing that maximum intensity occurred at a speed of about 12 miles per hour.

Mr. Warner gave in detail the difficulties of the street car companies in handling peak traffic, describing the many proposals for decreasing time consumed in loading passengers. He believed the motor bus had its place as a feeder or auxiliary to rapid transit. He advocated the adoption of staggered working hours for industries located in a given section so that the peak load would be relieved and greater comfort secured for all concerned.

Mr. Turner mentioned the plan he had proposed for a moving platform on 42d Street, to run from river to river, all trolley car tracks to be removed, and underground sidewalks provided for the whole width of the city at that point. He also mentioned his plan to reduce surface car trackage about 40%, by setting aside four longitudinal thoroughfares for vehicular traffic only, and advocated the adoption of police regulations to keep vehicles off the car tracks entirely during rush hours and prohibiting parking on certain streets at that time.

Mr. Fox strongly endorsed the "platoon system" proposed by Mr. Goodrich and showed how it conformed with the fundamental principle of railroad operation in that it kept the traffic in continuous movement in place of alternate stopping and starting.

Meeting of the Pittsburgh Section

A regular meeting of the Pittsburgh Section was held on January 30th, 1922, at the Hotel Chatham; Vice-President J. L. De Vou in the chair; Nathan Schein, Secretary; and present, also, 30 members.

The minutes of the previous meeting were read and approved.

The Secretary presented a communication from the Parent Society relative to information as to the sentiment of this District either for or against the Society joining the Federated American Engineering Association. On motion, duly seconded, the following resolution was unanimously adopted:

"That it is the sense of this meeting that the Parent Society join the Federated American Engineering Association."

On motion, duly seconded, the Secretary was instructed to send out a letter-ballot to the members of the Section to ascertain their sentiments relative to the Federated American Engineering Association, and also stating the action of this meeting.

Mr. J. M. Daniels, Secretary of the Pittsburgh University Student Chapter of the Society, addressed the Section, requesting aid in furnishing speakers for the Student Chapter meetings. On motion, duly seconded, this request was referred to the Executive Committee.

Messrs. T. J. Wilkerson and R. Khuen made a report on the Annual Meeting of the Society.

On account of the absence of President John N. Chester, the discussion of the possibility of reading papers before the Section was postponed, and a special meeting was requested to be held later for such discussion.

Dr. T. S. Baker, Acting President of the Carnegie School of Technology, addressed the Section on "French and German Relations", following which there was a general informal discussion of the subject by those present.

On motion, duly seconded, a rising vote of thanks was extended Dr. Baker for his address.

Meetings of the Portland Section

A meeting of the Portland Section was held on November 18th, 1921, at the University Club; President M. E. Reed in the chair; C. P. Keyser, Secretary; and present, also, 26 members and 9 guests.

The minutes of the meeting of October 28th, 1921, were, on motion, duly seconded, ordered passed for future reading.

On motion, duly seconded, the Secretary was instructed to send a letter of thanks to the Associated General Contractors for entertaining the members of the Section at dinner on November 2d, 1921.

The speaker of the evening, Mr. William H. Lewis, addressed the meeting on "The Construction of Embankments, Dams, and Stadiums by Hydraulic Sluicing", illustrating his remarks with lantern slides.

Meeting of December 16th, 1921

A dinner meeting of the Section was held at the University Club on December 16th, 1921, at which the members of the Portland Chapter of the Associated General Contractors were invited guests.

Following the dinner, the meeting was called to order by President M. E. Reed; C. P. Keyser, Secretary; and present, also, 28 members and 26 guests.

President Reed introduced Mr. Ellis F. Lawrence, who gave an outline of the purpose and objects of the recently instituted Building and Construction Association of Oregon. Mr. Lawrence was followed by Messrs. Mason and Dougan, who offered brief discussions on the subject.

Mr. A. R. Nichols presented a paper entitled "The Relation of the Smith-Hughes Law to Industry", in which he showed that skilled mechanics and artisans are decreasing in numbers, that there is virtually no system of ap-

prenticeship in the United States, and what the Government and State, in co-operation under this Law, are doing to train young men in the trades.

Following this paper, the meeting was thrown open to an informal discussion in which Messrs. Mason, Muir, McDougall, Kern, Griswold, and Welton took part. During this discussion, a suggestion was made that a committee be appointed to revise and standardize specifications, and President Reed stated that he would take action later on the suggestion.

Annual Meeting of the Portland Section

The Annual Meeting of the Portland Section was held on January 13th, 1922, at the University Club; President M. E. Reed in the chair; C. P. Keyser, Secretary; and present, also, 34 members and 1 guest.

The minutes of the meetings of October 28th, November 18th, and December 16th, 1921, were read, and subject to the addition of a record of the organization of the proposed board of works for the 1925 Fair, which was outlined by Mr. Stevens at the November 18th meeting, were approved.

The Annual Reports of the Treasurer and Secretary were presented, and on motion, duly seconded, were adopted, and ordered recorded with the minutes.

Mr. D. W. Cole reported for the Committee on Aggression of Certain Interests in National Parks that the cause of the Committee had virtually dissolved before the Committee had taken action.

The Secretary presented a communication from F. H. Murphy, Secretary of the Oregon Technical Council, advising that the term of Mr. J. C. Stevens as a delegate from the Section had expired, and asking that a successor be appointed. On motion, duly seconded, Mr. Stevens was re-appointed to serve for 1922 and 1923. On motion, duly seconded, the President and Secretary were named *ex-officio* alternates to the delegates.

It was moved and seconded that the dues for the year 1922 be fixed at $2.50 and that the Secretary be instructed to send out notices to all members in Oregon. On motion, duly seconded, an amendment to this motion, that action be held in abeyance pending a report from New York as to the ruling of the Board of Direction in the matter of allocated dues to the Section, was carried. The original motion was then put and carried.

On motion, duly seconded, it was decided to appoint a committee of three to revise the Constitution of the Section, and the Chair ruled that the appointment of the committee would be the duty of the incoming President.

The following officers for 1922 were declared elected: F. M. Randlett, President; W. G. Brown, Second Vice-President; C. N. Bennett, Treasurer; and C. P. Keyser, Secretary.

Mr. George E. Goodwin, Chief Engineer of the National Parks, gave an interesting talk on his work.

The meeting was also addressed by Mr. G. A. Kyle, who gave an entertaining account of some of his work and experiences in railroad building in China; Mr. Roy A. Klein who reviewed the work of the Highway Commission of Oregon since its inception, and indicated the scope of its program by maps and charts; and Prof. Stuart Sims who spoke briefly on the work of the Student Chapter of the Society at the Oregon Agricultural College.

Joint Meeting of the Providence Section and the Municipal Section of the Providence Engineering Society

A Joint Meeting of the Providence Section and the Municipal Section of the Providence Engineering Society was held on December 27th, 1921.

Mr. George Henderson, Civil Engineer, Rhode Island State Board of Public Roads, gave an informal talk on the State roads of Rhode Island, stressing particularly the details and application of the Federal Aid System for roads; the practice in Rhode Island of selecting a durable type of pavement for each road, which will utilize, as far as possible, materials to be found in its vicinity; and the practice in Rhode Island of building roads on the basis of "pay as you go" and building bridges by bond issues.

Regular Meeting of St. Louis Section

A regular meeting of the St. Louis Section was called to order at the American Hotel, on December 27th, 1921; President E. B. Fay in the chair; William C. E. Becker, Secretary; and present, also, 20 members.

The minutes of the meeting of November 28th, 1921, were read and approved.

The President announced the appointment of the Program Committee as follows: Messrs. S. Bent Russell, Chairman, W. W. Horner, and J. W. Skelley.

The death of Hiram Phillips, M. Am. Soc. C. E., was announced by President Fay, who also stated that a telegram had been sent to Mrs. Phillips expressing the sympathy of the Section.

On motion, duly seconded, the President was instructed to appoint a committee to prepare a resolution to the memory of Mr. Phillips and also to prepare a memoir of him for publication in the *Proceedings* of the Society. The President subsequently appointed as such Committee, Messrs. E. E. Wall, Chairman, J. T. Garrett, and S. Bent Russell.

The proposed amendments to the Constitution of the Society to be considered at the Annual Meeting were then discussed, and, on motion, duly seconded, the amendments to Articles II, IV, and VII, pertaining to "Membership", "Dues", and "Nomination and Election of Officers", respectively, were approved by the Section.

On motion, duly seconded, it was decided that no action should be taken by the Section on the other proposed amendments.

On motion, duly seconded, it was decided that if only one meeting of the Society could be held in St. Louis, in 1922, that preference be given to the Annual Convention.

Mr. E. E. Wall announced that a fund was being raised by subscription from members of the Society for the purchase of a bust of the late James Buchanan Eads, F. Am. Soc. C. E., to be placed in the Hall of Fame of New York University. The discussion following this announcement indicated that the subscription would meet with the hearty approval of the members of the Section.

The meeting was addressed by J. W. Woermann, M. Am. Soc. C. E., who spoke on the activities of the Chicago Section and other Engineering Societies.

Meetings of the San Diego Section

A meeting of the San Diego Section was held on October 18th, 1921, at which, in addition to the routine business, Mr. George Cromwell gave an interesting outline of the results of studies and investigations relating to the future development of the water supply system of San Diego.

At the meeting which was held on November 15th, 1921, the speaker was Mr. R. M. Morton, who discussed the highway system of San Diego County now under construction and various features of highway construction in general.

A special meeting of the Section was held on December 12th, 1921, coinciding with the hearing on the Boulder Canyon Project for the control of the Colorado River, which was held in San Diego by the Secretary of the Interior and Arthur P. Davis, Past-President, Am. Soc. C. E., Director of the U. S. Reclamation Service.

After a brief discussion of Society affairs, Mr. Davis outlined the salient features of the Boulder Canyon Project and the future development of the Southwest which would be made possible thereby.

The meeting was also addressed by Messrs. George G. Anderson and C. E. Grunsky, who related some of the early history connected with the development of the Imperial Valley, and J. C. Allison, M. Am. Soc. C. E., a resident of the Imperial Valley, gave an account of the work now under way for river control and flood protection in the Valley.

This meeting of the Section was an open meeting and was attended by a number of engineers residing in San Diego and its vicinity.

EMPLOYMENT SERVICE OF THE FEDERATED AMERICAN ENGINEERING SOCIETIES

An Engineering Societies Service Bureau was established December 1st, 1918, as an activity of Engineering Council, managed by a board made up of the Secretaries of the four Founder Societies, funds for its maintenance being provided by these Societies. On January 1st, 1921, this Bureau was taken over by The Federated American Engineering Societies and is now known as the Employment Service of that organization. It is co-operating with engineering organizations in all parts of the country and is desirous of increasing such co-operation by working with local engineering associations and clubs. Members of the American Society of Civil Engineers who desire to register should apply for further information, registration forms, etc., to Walter V. Brown, Manager, Engineering Societies Building, 29 West 39th Street, New York City. In order to be included in the list published in *Proceedings,* copy must be received on or before the first Wednesday of each month. All communications should be addressed to Mr. Brown.

EMPLOYMENT BULLETIN

POSITIONS AVAILABLE

RESEARCH GRADUATE ASSISTANTSHIPS in Engineering Experiment Station, University of Illinois. Open to graduates of approved American and foreign universities and technical schools prepared to undertake graduate study in engineering, physics, or applied chemistry. Appointment must be accepted for two consecutive collegiate years, after which, if all requirements have been met, the degree of Master of Science will be conferred. Work of the Department will require about half the time of the Research Graduate Assistant, the remainder being available for graduate study. Nominations to positions are made from applications to the Director of the Engineering Experiment Station each year not later than March 1st, and are based on character, scholastic attainments, and promise of success in principal line of research to which candidate proposes to devote himself, preference being given to those with some practical engineering experience following undergraduate work. Appointments are made in Spring and become effective following September 1st. Vacancies are filled at other times. Assistantships carry an annual stipend of $600 and freedom from all fees, except matriculation and diploma fees. For adidtional information address, The Director, Engineering Experiment Station, University of Illinois, Urbana, Ill.

ENGINEER to sell service. Should know building alteration and repair work. Application by letter only. Commission basis. V–127.

MEN AVAILABLE

GRADUATE CIVIL ENGINEER, Dr. Eng., M. Am. Soc. C. E. Specialist in hydrography, river and harbor improvements, port works and jetty construction. Can design and execute the works indicated. Has had experience in Mexico, Guatemala, Panama, and Brazil. Is familiar with Portuguese, Spanish, and French languages. Best of references furnished. CE–299.

CIVIL ENGINEER, Assoc. M. Am. Soc. C. E., age 31, married. College graduate. Ten years' experience covers design, construction, estimates, and executive authority on steel and reinforced concrete structures, municipal and highway design. Available on short notice. CE–300.

CIVIL AND HIGHWAY ENGINEER, Assoc. M. Am. Soc. C. E., age 31. Graduate Civil Engineer. Desires position with consulting engineer, engineering firm, or as highway contractor's engineer. Experience of 6½ years, in charge of all kinds of surveys, drafting, designs, and estimates, and of construction of highways and bridges on city, county, and State work. Four years of this time on county and State highway work as Resident and Assistant Engineer. Available at once. Location in East preferred. CE–301.

HYDRAULIC ENGINEER AND SUPERINTENDENT, M. Am. Soc. C. E. Graduate Civil Engineer. Twenty-six years' experience as Engineer and Superintendent, water, sewer, electric railway, and hydroelectric power development. Last four years with War Department as Major, Engineers, and as civilian employee in charge of maintenance and operation of utilities. Desires work with power company after February 1st. Can qualify for exploration, design, construction, or appraisal, and will go anywhere. CE–302.

CIVIL ENGINEER, M. Am. Soc. C. E. College graduate. Twenty-six years' experience on railroad location and construction public building design and construction, hydraulic and power plant construction, municipal work, and concrete construction. Efficient executive and organizer. Excellent record and references. Desires responsible position with banking house or financial interests for making investigations, reports, appraisals, estimates. Will consider any proposition, engineering or associated work. Now employed, but available on short notice. CE–303.

CIVIL ENGINEER, Assoc. M. Am. Soc. C. E., age 30, married. Six years' on industrial construction, two years on railroad construction, one year overseas as 1st Lieutenant, Engineers. Available at once. CE–304.

MECHANICAL AND CIVIL ENGINEER, Assoc. M. Am. Soc. C. E., and M. I. Mech. Engrs., Great Britain, age 47, married. Twenty-five years' works and office experience in United States and Europe. Served as chief designer, chief draftsman, and master mechanic with large firms of shipbuilders, steel manufacturers, and general engineers. Head instructor in vocational classes. Desires position anywhere, at once. CE–305.

CIVIL ENGINEER, Jun. Am. Soc. C. E. Technical graduate. Six years' experience on water-works, building, and highway construction; reinforced concrete design. Location immaterial. Available on short notice. CE–306.

EXPERT STRUCTURAL ENGINEER wishes position in charge of structural work for leading architect, engineer, or industrial corporation, in or near New York City. Salary, $4 000. CE–307.

ENGINEER, Jun. M. Am. Soc. C. E., age 26, married. More than five years' experience, highways, bridges, sewers, reinforced concrete, topographic mapping, and surveying, includes office computing, and drafting, charge of field work, and field inspection. Desires any permanent connection with good possibilities for advancement. Eastern States preferred. CE–308.

ENGINEER AND CONSTRUCTOR, M. Am. Soc. C. E., age 44. Twenty-four years' experience as engineer, superintendent, and executive in the United States, Alaska, Canal Zone, and Peru, principally in charge of city improvements, river and harbor improvements, dredging, hydro-electric construction, irrigation, shipbuilding, dams, buildings, etc. Speaks Spanish. CE–309.

CIVIL-MECHANICAL SUPERVISING ENGINEER, Assoc. M. Am. Soc. C. E., age 35. Well varied experience in power, hydraulic, and industrial work, both engineering and construction. Record of responsible and executive connections with well-known organizations; thorough business training. Experience throughout the country; now in Chicago District. CE–310.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

PROGRAM FOR MONTHLY SOCIETY MEETINGS

The Publication Committee announces the following tentative program covering the monthly meetings up to the summer recess. In each case, the meetings will be held on the Fifth Floor of the Engineering Societies Building, 33 West 39th St., New York City, at 8 P. M., on the days noted.

March 1st, 1922.—A regular monthly business meeting will be held, at which time the ballot on the Proposed Amendments to the Constitution will be canvassed, followed by the formal presentation of the paper, "Siphon Spillways", by G. F. Stickney, M. Am. Soc. C. E. This paper appears in the current issue of *Proceedings.*

April 5th, 1922.—Paper by Gustav Lindenthal, M. Am. Soc. C. E., entitled "The Continuous Truss Bridge Over the Ohio River at Sciotoville, Ohio, of the Chesapeake and Ohio Northern Railway", to be published in March *Proceedings,* and presented by the author for discussion.

May 3d, 1922.—Paper by Arthur T. Safford, M. Am. Soc. C. E., and Edward Pierce Hamilton, Esq., entitled "The American Mixed Flow Turbine and Its Setting", to be published in April *Proceedings,* and presented by Mr. Safford for discussion.

June 7th, 1922.—Informal discussion on "Tentative Specifications for Steel Railway Bridges", submitted as a Progress Report of the Special Committee on Specifications for Bridge Design and Construction, and published in the December, 1921, *Proceedings.*

SPRING SOCIETY MEETING

At its meeting on January 20th, 1922, the Board of Direction adopted the plan of holding Spring and Fall Meetings in different parts of the country to consider National economic problems in their broader phases. The first meeting of this series has been scheduled to be held in Dayton, Ohio, on April 5th and 6th, 1922, on the subject of "Flood Problems". A detailed program will be mailed to the membership in due course.

LIBRARY BOOK LOANS

The Library Board of the Engineering Societies Library has adopted rules authorizing the Director of the Library to lend to members of any Founder Society any duplicate books in the Library, subject to the following rules:

1.—Duplicate books may be lent to members of Founder Societies or of any other societies that contribute to maintain the Library.

2.—Books will be lent for twenty-eight days, including time in transit.

3.—Five cents a day will be charged for each book kept longer than twenty-eight days.

4.—Borrowers shall be responsible for books borrowed, and shall pay shipping and insurance charges from and to the Library.

The Library has several thousand volumes that can be lent under this authorization. These include a considerable number of textbooks, reports, etc., of various dates. Periodicals are not included, as the cost of storing duplicate sets seems prohibitive and individual articles can be photoprinted at little expense. The collection is being increased regularly by the addition of any suitable duplicates received by the Library. Members are invited to present any books of permanent value for this purpose, which they can spare from their libraries. It is hoped that in time the collection may become adequate to meet the usual needs of members by providing any standard book required for a short time.

No catalog has been published, although it is hoped that one may be, when the collection becomes extensive enough to warrant doing so. Until that time, the Director will be glad to receive requests and report whether the books are available or not.

SEARCHES IN THE LIBRARY

As the Library of the American Society of Civil Engineers has been merged in the Engineering Societies Library, requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York City, who will gladly give information concerning the charges for the various kinds of service. A more comprehensive statement in regard to this matter will be found on page 21 of the Year Book for 1921.

SECOND MEETINGS OF THE MONTH

Under authority given by the Board of Direction at its meeting of August 9th, 1920, the Acting Secretary has made an arrangement with the New York Section whereby the latter will take over the second meeting of the month, and will thus hold its own meetings on the third Wednesday of each month, except January and May, when they are held on the second Wednesday.

The programs of the New York Section* are similar to those heretofore offered by the Society's Committee on Second Meeting of the Month, and it is understood that all members of the Society are invited to attend the meetings regardless of whether or not they may be members of the Section. This arrangement gives each member the same privilege of attendance at meetings which he has heretofore enjoyed, and is deemed especially desirable since there has been considerable doubt as to the attendance that might develop at the several meetings if three were held in each month.

PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications

* *Proceedings*, Am. Soc. C. E., October, 1921, p. 803.

from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper. Written discussion on a given paper will be closed three months after the paper has been published, so that the author's closure can be printed four months after the paper.

All manuscripts submitted for publication should preferably be typewritten, and always double spaced. Drawings and diagrams should be on separate sheets, drawn to a scale suitable for about one-half to one-fourth reduction.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availablity for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be set down for presentation to a future meeting of the Society, and, on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 36 of the Year Book for 1921.

LOCAL SECTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Section (Constitution Approved by Board, 1905).

Thomas H. Means, President; H. D. Dewell, Secretary-Treasurer, 503 Market Street, San Francisco, Cal.

Bi-monthly meetings are held at 6 P. M., at the Engineers' Club, 57 Post Street, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting. Informal luncheons are held at noon, every Wednesday, at the Engineers' Club. All members of the Society will be gladly welcomed.

Colorado Section (Constitution Approved by Board, 1909).

A. N. Miller, President; Thomas H. Olds, Acting Secretary-Treasurer, First National Bank Building, Denver, Colo.

Meetings are held on the second Monday of each month, except July and August, usually preceded by an informal dinner. Weekly luncheons are held on Wednesday, at 12.30 P. M., at Daniels and Fisher's. Visiting members of the Society are urged to attend.

Atlanta Section (Constitution Approved by Board, 1912).

William C. Spiker, President; Frederick H. McDonald, Secretary-Treasurer, 1530 Healey Building, Atlanta, Ga.

Informal luncheons are held on the second Tuesday of each month, at 1.00 P. M., at the Ansley Hotel, to which visiting members of the Society are welcome. Visitors desiring information will telephone the Secretary.

Baltimore Section (Constitution Approved by Board, 1914).

Ezra B. Whitman, President; George S. Robertson, Sr., Secretary-Treasurer, 1628 Linden Avenue, Baltimore, Md.

Buffalo Section (Constitution Approved by Board, 1921).

A. L. Johnson, President; Bruce L. Cushing, Secretary-Treasurer, 80 West Genesee Street, Buffalo, N. Y.

Central Ohio Section (Constitution Approved by Board, 1921).

F. H. Eno, President; H. F. Schryver, Secretary, 405 New York Central Building, Columbus, Ohio.

Meetings are held at the rooms of the Engineers' Club of Columbus in the Southern Hotel. The Annual Meeting is held on the second Friday of November and at least two other meetings are held each year, the dates of which are designated by the Board of Direction of the Section.

Cincinnati Section (Constitution Approved by Board, 1920).

Edgar Dow Gilman, President; Alphonse M. Westenhoff, Secretary, 13 East Third Street, Cincinnati, Ohio.

Cleveland Section (Constitution Approved by Board, 1915).

A. V. Ruggles, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Regular meetings are held on the second Wednesday of each month, at 12.15 P. M., in the rooms of the Section, Hotel Winton. Luncheon is served, and all visiting members of the Society are invited to attend.

Connecticut Section (Constitution Approved by Board, 1919).

William J. Backes, President; Clarence M. Blair, Secretary-Treasurer, 785 Edgewood Avenue, New Haven, Conn.

The Annual Meeting is held in April; fortnightly meetings alternate between Hartford and New Haven, Conn. These meetings are informal luncheon gatherings, held usually at noon on Saturday. Members are privileged to invite guests regardless of their affiliation as engineers.

Detroit Section (Constitution Approved by Board, 1916).

H. H. Esselstyn, President; Alex. Linn Trout, Secretary-Treasurer, 2974 Field Avenue, Detroit, Mich.

Regular meetings are held on the second Friday of December, April, and October, the last being the Annual Meeting.

District of Columbia Section (Constitution Approved by Board, 1916).

Gratz B. Strickler, President; James H. Van Wagenen, Secretary-Treasurer, 2001 Sixteenth Street, N. W., Washington, D. C.

Duluth Section (Constitution Approved by Board, 1917).

John L. Pickles, President; Walter G. Zimmermann, Secretary, 203 Wolvin Building, Duluth, Minn.

Regular meetings are held at noon on the third Monday of each month, usually at the Kitchi Gammi Club, to which visiting members of the Society will be welcomed. The Annual Meeting is held on the third Monday in May.

Illinois Section (Constitution Approved by Board, 1916).

A. J. Hammond, President; W. D. Gerber, Secretary-Treasurer, 133 West Washington Street, Chicago, Ill.

Regular meetings are held on the second Monday of March, June, September, and December, the last being the Annual Meeting.

Iowa Section (Constitution Approved by Board, 1920).

J. H. Dunlap, President; R. W. Crum, Secretary, Care, Iowa State Highway Commission, Ames, Iowa.

Kansas City (Mo.) Section (Constitution Approved by Board, 1921).

John V. Hanna, President; Henry C. Tammen, Secretary-Treasurer, 1012 Baltimore Avenue, Kansas City, Mo.

Regular meetings of the Section are held on the first Tuesday of March, June, September, and December, the last being the Annual Meeting. The members of the Kansas City Engineers' Club meet at luncheon at the University Club every Tuesday from 12 M. to 2 P. M., and all members of the Society are invited to attend these luncheons.

Kansas Section (Constitution Approved by Board, 1920).

L. E. Conrad, President; Frank S. Altman, Secretary-Treasurer, 1114 Garfield Avenue, Topeka, Kans.

Los Angeles Section (Constitution Approved by Board, 1913).

Ralph J. Reed, President; Floyd G. Dessery, Secretary, 619 Central Building, Los Angeles, Cal.

Regular monthly meetings are held on the second Wednesday of each month, the Annual Meeting in December. Informal luncheons in connection with the Joint Technical Societies of Los Angeles are held at 12.15 P. M., every Thursday at the Broadway Department Store Café.

Louisiana Section (Constitution Approved by Board, 1914).

Ole K. Olsen, President; F. A. Muth, Secretary, 224 Custom House Building, New Orleans, La.

Regular meetings are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

Nashville Section (Constitution Approved by Board, 1921).

Arthur J. Dyer, President; Granbery Jackson, Secretary-Treasurer, 220 Capitol Boulevard, Nashville, Tenn.

Nebraska Section (Constitution Approved by Board, 1917).

William Grant, President; Homer V. Knouse, Secretary-Treasurer, 200 City Hall, Omaha, Nebr.

Regular meetings are held on the first Saturday of each month, except July and August. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January. Visiting members of the Society are especially urged to communicate with the Secretary when in the city.

New York Section (Constitution Approved by Board, 1920).

Nelson P. Lewis, President; J. P. J. Williams, Secretary, 33 West 39th Street, New York City.

Regular meetings are held in the Engineering Societies Building, 29 West 39th Street, New York City, on the third Wednesday of each month, except January and the Annual Meeting in May, held on the second Wednesday of the month.

Northeastern Section (Constitution Approved by Board, 1921).

Frank B. Sanborn, Chairman; Charles W. Banks, Secretary, Wentworth Institute, Boston, Mass.

Northwestern Section (Constitution Approved by Board, 1914).

Charles L. Pillsbury, President; Paul C. Gauger, Secretary, 945 Osceola Avenue, St. Paul, Minn.

Meetings are held bi-monthly, alternating between St. Paul and Minneapolis, on the third Friday of each month.

Oklahoma Section (Constitution Approved by Board, 1920).

Max L. Cunningham, President; R. E. Brownell, Secretary-Treasurer, 402 First National Bank Building, Oklahoma, Okla.

Philadelphia Section (Constitution Approved by Board, 1913).

Benjamin Franklin, President; S. C. Hollister, Secretary, 1200 Land Title Building, Philadelphia, Pa.

Regular meetings are held at the Engineers' Club on the first Monday in January, April, and October, the last being the Annual Meeting. Special meetings are also held at times announced in advance.

Pittsburgh Section (Constitution Approved by Board, 1918).

J. N. Chester, President; Nathan Schein, Secretary-Treasurer, 1510 Carson Street, Pittsburgh, Pa.

Portland (Ore.) Section (Constitution Approved by Board, 1913).

F. M. Randlett, President; C. P. Keyser, Secretary, 318 City Hall, Portland, Ore.

Meetings are held regularly on the third Friday of each month. All members of the Society in any grade are cordially invited to attend.

Providence (R. I.) Section (Constitution Approved by Board, 1920).

Sydney Wilmot, Chairman; Robert L. Bowen, Secretary-Treasurer, 26 Sycamore Street, Providence, R. I.

The Section regularly holds meetings jointly with the Structural and Municipal Sections of the Providence Engineering Society, at the Society Rooms, 29 Waterman Street, on the fourth Tuesday of each month, from September to May. The Annual Meeting is held in May. All visiting members of the Society are cordially invited to attend these meetings.

St. Louis Section (Constitution Approved by Board, 1914).

E. B. Fay, President; William C. E. Becker, Secretary-Treasurer, 426 City Hall, St. Louis, Mo.

The Annual Meeting is held on the fourth Monday in November. Two meetings each year for the presentation and discussion of technical papers are held in the Auditorium of the Engineers' Club, and are open to members of the Associated Societies. Other "get-together" meetings are held regularly for dinner or luncheon on the fourth Monday of each month except July, August, and November.

San Diego Section (Constitution Approved by Board, 1915).

F. J. Grumm, President; J. Y. Jewett, Secretary-Treasurer, Administration Building, Balboa Park, San Diego, Cal.

Regular meetings are held on the third Tuesday of each month at the Chamber of Commerce. Visiting members of the Society are invited to attend.

Seattle Section (Constitution Approved by Board, 1913).

F. F. Sinks, President; Frank H. Fowler, Secretary-Treasurer, 1319 L. C. Smith Building, Seattle, Wash.

Regular meetings, with luncheon, are held at the Engineers' Club, on the last Monday of each month. All members in any grade of the Society are cordially invited to attend, and if located in this District for any length of time, their membership in the Section will be appreciated.

Spokane Section (Constitution Approved by Board, 1914).

E. G. Taber, President; Charles E. Davis, Secretary-Treasurer, 401 City Hall, Spokane, Wash.

Meetings are held on the second Friday of each month. These meetings are noonday luncheons at Davenport's, and all visiting members of the Society are invited to attend.

Texas Section (Constitution Approved by Board, 1913).

E. B. Cushing, President; E. N. Noyes, Secretary, 1107 Dallas County Bank Building, Dallas, Tex.

Utah Section (Constitution Approved by Board, 1916).

W. R. Armstrong, President; H. S. Kleinschmidt, Secretary-Treasurer, 222 Felt Building, Salt Lake City, Utah.

The Annual Meeting is held on the first Wednesday in April. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

STUDENT CHAPTERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS*

Stanford University Student Chapter, Organized 1920.

R. I. Hill, President; John H. Colton, Corresponding Secretary, Box 121, Stanford, Cal.

Alabama Polytechnic Institute Student Chapter, Organized 1921.

Alfred D. Boyd, Secretary, Alabama Polytechnic Institute, Auburn, Ala.

Braune Civil Engineering Society (University of Cincinnati) Student Chapter, Organized 1920.

John W. Guilday, President; C. A. Harrell, Secretary of Section 10; R. Blickensderfer, Secretary of Section 20; University of Cincinnati, Cincinnati, Ohio.

California Institute of Technology Student Chapter, Organized 1921.

W. M. Taggart, President; Douglas A. Stromsoe, Secretary, California Institute of Technology, Pasadena, Cal.

Carnegie Institute of Technology Student Chapter, Organized 1922.

J. K. Elliott, Secretary, Carnegie Institute of Technology, Pittsburgh, Pa.

Cornell University Student Chapter, Organized 1921.

T. D. Finn, Jr., President; James Hannigan, Secretary-Treasurer, Lincoln Hall, Cornell University, Ithaca, N. Y.

* By a recent ruling of the Board of Direction, the minimum membership of a Student Chapter has been fixed at 12 instead of 20.

Drexel Institute Student Chapter, Organized 1920.

C. V. Nishwitz, Chairman; Raymond Radbill, Secretary, Drexel Institute, Philadelphia, Pa.

Iowa State College Student Chapter, Organized 1920.

Raymond L. Whammel, President; G. La Verne Day, Secretary, Iowa State College, Ames, Iowa.

Johns Hopkins University Student Chapter, Organized 1921.

Eric M. Arndt, President; Melvin E. Scheidt, Secretary, Box 566, Homewood, Baltimore, Md.

Lafayette College Student Chapter, Organized 1922.

James D. Groff, Jr., Acting Secretary, Lafayette College, Easton, Pa.

Massachusetts Institute of Technology Student Chapter, Organized 1921.

D. H. McCreery, President; T. S. Wray, Secretary, Massachusetts Institute of Technology, Cambridge, Mass.

Montana State College Student Chapter, Organized 1922.

Emmett Moore, Secretary, 921 South Third Avenue, Bozeman, Mont.

New York University Student Chapter, Organized 1921.

George H. Martin, President; Abram J. Jacobs, Secretary, 302 Gould Hall, New York University, New York City.

Ohio State University Student Chapter, Organized 1922.

O. W. Merrell, President, 65 Thirteenth Avenue, Columbus, Ohio.

Oregon State Agricultural College Student Chapter, Organized 1921.

Richard D. Slater, President; Wilbur H. Welch, Secretary, Oregon State Agricultural College, Corvallis, Ore.

Pennsylvania State College Student Chapter, Organized 1920.

Arthur H. McFadden, President; William W. Seltzer, Secretary, Pennsylvania State College, State College, Pa.

Polytechnic Institute of Brooklyn Student Chapter, Organized 1921.

W. C. Hanning, President; S. Lordi, Secretary, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Purdue University Student Chapter, Organized 1921.

R. O. Edwards, President; W. C. Mason, Secretary-Treasurer, Purdue University, West Lafayette, Ind.

Rensselaer Polytechnic Institute Student Chapter, Organized 1920.

William Minot Thomas, President; Earl D. Hopkins, Secretary, 147 Eighth Street, Troy, N. Y.

Rose Polytechnic Institute Student Chapter, Organized 1921.

Robert Cash, President; F. Ray Martin, Secretary-Treasurer, Rose Polytechnic Institute, Terre Haute, Ind.

Rutgers College Student Chapter, Organized 1921.

L. C. Kuhl, President; A. C. Ely, Secretary, 105 Winants Hall, Rutgers College, New Brunswick, N. J.

State University of Iowa Student Chapter, Organized 1921.

James Fred Phillips, President; Louis E. Bagg, Secretary, State University of Iowa, Iowa City, Iowa.

Swarthmore College Student Chapter, Organized 1921.

Frank Lemke, President; H. Chandlee Turner, Jr., Secretary, Swarthmore College, Swarthmore, Pa.

Syracuse University Student Chapter, Organized 1921.

Arthur V. Dollard, Secretary, College of Applied Science, Syracuse University, Syracuse, N. Y.

University of California Student Chapter, Organized 1921.

H. G. Gerdes, Secretary, Care, Prof. Charles Derleth, Jr., College of Civil Engineering, University of California, Berkeley, Cal.

University of Colorado Student Chapter, Organized 1920.

Herbert Altvater, President; Charles Bowden, Secretary, 1229 University Avenue, Boulder, Colo.

University of Illinois Student Chapter, Organized 1921.

A. L. R. Sanders, President; M. E. Jansson, Secretary, University of Illinois, Urbana, Ill.

University of Kansas Student Chapter, Organized 1921.

W. W. Hoagland, President; Waldo G. Bowman, Secretary, 1106 Ohio Street, Lawrence, Kans.

University of Kentucky Student Chapter, Organized 1921.

H. J. Beam, President; H. E. Glenn, Secretary-Treasurer, 348 Harrison Avenue, Lexington, Ky.

University of Maine Student Chapter, Organized 1921.

George H. Ferguson, Jr., Secretary, University of Maine, Orono, Me.

University of Minnesota Student Chapter, Organized 1921.

C. L. Swanson, President, 1716 Tyler Street, N. E., Minneapolis, Minn.

University of Missouri Student Chapter, Organized 1922.

J. D. Sandker, Secretary, 407 West Broadway, Columbia, Mo.

University of Nebraska Student Chapter, Organized 1921.

J. E. Applegate, President; W. H. Mengel, Secretary, University of Nebraska, Lincoln, Nebr.

University of North Carolina Student Chapter, Organized 1921.

H. G. Baity, President; L. I. Lassiter, Secretary, University of North Carolina, Chapel Hill, N. C.

University of Pennsylvania Student Chapter, Organized 1920.

Charles W. Foppert, President; Fred Welchy, Secretary, University of Pennsylvania, Philadelphia, Pa.

University of Pittsburgh Student Chapter, Organized 1921.

L. W. Fletcher, President; J. M. Daniels, Secretary, University of Pittsburgh, Pittsburgh, Pa.

University of Texas Student Chapter, Organized 1921.

Frank Cannon, President; Claude Riney, Secretary, 1908 Wichita Street, Austin, Tex.

University of Washington Student Chapter, Organized 1921.

B. W. Brown, President; G. E. Large, Secretary, 4518 Eleventh Avenue, N. E., Seattle, Wash.

University of Wisconsin Student Chapter, Organized 1921.

E. K. Loverud, President; L. H. Kessler, Secretary, 235 West Gilman Street, Madison, Wis.

Virginia Military Institute Student Chapter, Organized 1921.

Benjamin F. Parrott, President; R. G. Hunt, Secretary-Treasurer, Virginia Military Institute, Lexington, Va.

Virginia Polytechnic Institute Student Chapter, Organized 1922.

J. Byron Herring, Secretary, Virginia Polytechnic Institute, Blacksburg, Va.

Washington University Collimation Club Student Chapter, Organized 1920.

William D. Rolfe, President; Erwin Bloss, Secretary, Washington University, St. Louis, Mo.

West Virginia University Student Chapter, Organized 1921.

J. E. Wheeler, President; Milton Jarrell, Secretary, 113 Beverly Avenue, Morgantown, W. Va.

Yale University Student Chapter, Organized 1921.

W. S. Moore, President; T. T. McCrosky, Secretary, Sheffield Scientific School, Yale University, New Haven, Conn.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Members of the American Society of Civil Engineers will be welcome in the Reading Rooms and at the meetings of many engineering societies in all parts of the world. A list of such societies will be found on pages 48, 49, and 50 of the Year Book of the Society for 1921.

ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31ST, 1921.

In compliance with the Constitution, the Board of Direction presents its report for the year ending December 31st, 1921.

MEMBERSHIP

The changes in membership are shown in the following table:

	JAN. 1ST, 1921.			JAN. 1ST, 1922.			LOSSES.				ADDITIONS.		TOTALS.		
	Resident.	Non-Resident.	Total.	Resident.	Non-Resident.	Total.	Transfer.	Resignation.	Dropped.	Death.	Transfer.	Election.	Loss.	Gain.	Increase.
Honorary Members	.....	3	3	.....	5	5	0	0	0	3	*2	3	3	5	2
Members	780	3 464	4 244	821	3 645	4 466	2	39	13	56	†169	163	110	332	222
Associate Members	738	4 289	5 027	788	4 443	5 231	167	71	52	25	‡65	¶454	315	519	204
Affiliates	65	110	175	62	110	172	3	3	2	6	.....	11	14	11	§3
Juniors	86	362	448	88	370	458	64	13	25	..	.....	112	102	112	10
Fellows	5	5	10	4	6	10	....	....	...	..	.....	.....	....	....	...
Totals	1 674	8 233	9 907	1 763	8 579	10 342	236	126	92	90	236	743	544	979	435

* 2 Members.
† 167 Associate Members, 2 Affiliates.
‡ 1 Affiliate, 64 Juniors.
‖ 5 Reinstatements.
¶ 7 Reinstatements.
§ Decrease.

The net increase in membership for the year is 435. This is somewhat remarkable in view of adverse business conditions during the past twelve months.

The total number of applications received has been 1 054: 745 for admission and 309 for transfer.

The losses by death during the year number 90, and are as follows:

Honorary Members (3): *Sir* Douglas Fox, Alexander Mackenzie, Hiram Francis Mills.

Members (56): David Herbert Andrews, William Edgar Baker, Edward Chester Barnard, John Bealle Battle, George Pierrepont Bland, William Henry Booth, William Henry Brenton, James Simpson Browne, John Ryan Burke, Frederick William Cappelen, Eliot Channing Clarke, Thomas Curtis Clarke, William Brown Cogswell, Hartwell Prentice Farrar, Richard Henwood Gillespie, Samuel Merrill Gray, Peter Conover Hains, John Baillie Henderson, Howard Carleton Holmes, David Carlisle Humphreys, Aron Lancaster Hunt, *Sir* John Kennedy, Eugene Willett Van Court Lucas, Michael Lehane Lynch, Wisner Martin, Willard Atherton Nichols, Paul Maningham Norboe, James Owen, Maurice Stiles Parker, Edmund Taylor Perkins, Philo Sackett Perkins, Hiram Phillips, Charles Henry Prior, John Charles Quintus, Charles Ward Raymond, William Harper Robinson, Bernhard Martin Samuelson, Robert Carlos Sattley, Adolph Eugene Schneeweiss, James Cruickshank Scorgie,

William Henry Searles, James Alexander Seddon, George Steele Skilton, M. Everhart Smith, George Duncan Snyder, Harry Elstner Talbott, Samuel Everett Tinkham, Alfred Thomas Tomlinson, Warren Chamberlain Tudbury, John Findley Wallace, George Herbert Webb, Thomas Delano Whistler, William Glyde Wilkins, John Wilson, Sebastian Wimmer, Preston King Yates.

Associate Members (25): Anthony George Armstrong, James Gibbons Browne, Joseph Miller Burkett, Dudley Chipley, Fred Wallis Daggett, William James Davis, Thomas George Elbury, Samuel Alexander Forter, Franklin Lincoln Gibboney, Richard Tuggle Goodwyn, Jr., John Edward Grady, Edgar Miller Graham, Gisli Gudmundsson, Arthur John Hart, Henry Harvie, Julius James Knoch, Charles Raymond Larkin, Harry Milton Lynde, Michael Joseph McDonough, Frederic Cramer Mierow, Ralph Ewart Robson, Andrew Francis Ross, Hugo Julius Scheuermann, Eliot Nichols Smith, William Albert Yeo.

Affiliates (6): Charles Whiting Bradley, George Lord Burrows, James Richard Donald Mackenzie, Calvin Tomkins, Joseph Agur Wells, James Francis Wrenn.

LIBRARY

The Engineering Societies Library received during 1921, a total of 2 429 volumes (1 394 by gift, 368 by purchase), 1 112 pamphlets (1 066 by gift, 46 by purchase), and 193 maps and plans, making a total of 157 530 now in the permanent collection.

Expenditures for books, periodicals, supplies, and salaries were approximately $27 000. The total attendance was 26 840, about 12% greater than in 1920. In addition, about 8 000 non-visitors were assisted by mail or telephone. The average daily attendance was 88.

The task of recataloging the collection still occupies the chief attention of the Library Staff. During the year 20 096 volumes were recataloged and 103 809 cards prepared and added to the catalog. The catalog now contains specific references to more than 33 513 subjects.

The Service Bureau made 332 searches and copies of searches, and translated 111 articles, totaling 289 000 words. It prepared 23 272 photoprints for 2 342 persons. The receipts for this work were about $15 749.19.

Among the unusual acquisitions of the year were a collection of French medals commemorative of important engineering events, presented by the Chairman of the Library Board, Robert A. Cummings, M. Am. Soc. C. E.; and a collection of autograph manuscripts of Robert Fulton and Benjamin H. Latrobe.

The Endowment Committee has continued with the same membership. In July, the Carnegie Corporation appropriated $10 000 annually for two years, to assist in meeting the expense of recataloging the Library, and, in September, the National Electric Light Association contributed $1 000 for library maintenance. These generous contributions are valuable not only for the material assistance they afford, but also in indicating the value that other organizations place on the Library as an aid to engineers.

READING ROOM

The Reading Room of the Society had an attendance during the year of 5 051, which is an increase of about 23% over 1920, the daily average being 17.

A number of new technical and several non-technical magazines have been added to the periodicals received regularly. The collection of new books of particular interest to civil engineers has been enlarged by donations from members of the Society as well as by purchase.

The monthly list of recent engineering articles of interest which is prepared by the assistants in the Reading Room contained 3 305 classified references to 91 periodicals and covered 76 pages. The usefulness of this list has been enhanced by the translation of the foreign titles.

EMPLOYMENT SERVICE

The Society has co-operated in the management and shared in the expense of the Employment Service maintained by the Federated American Engineering Societies. This service, initiated by Engineering Council in 1918, has proved increasingly useful. The number of men registered and placed is indicated below:

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Number of men registered	195	174	183	200	166	293	128	123	107	139	86	111	1 905
Total men placed	91	107	95	94	150	96	103	93	148	124	120	144	1 365

COMMITTEES

There are in existence at the present time seven Special Committees to report on engineering subjects, as follows:

To Codify Present Practice on the Bearing Value of Soils for Foundations (Authorized December 3d, 1912).

Stresses in Railroad Track (Authorized November 12th, 1913).

Highway Engineering (Authorized October 14th, 1919).

To Consider and Recommend for Adoption a Specification for Bridge Design and Construction (Authorized August 9th, 1920).

Industrial Education (Authorized April 25th, 1921).

General Form of Contract Standard Clauses (Authorized June 6th, 1921).

On Research (Authorized October 10th, 1921).

AMENDMENTS TO THE CONSTITUTION

A Revised Constitution was adopted by the Society October 5th (effective November 5th), 1921. The principal features of the new Constitution are the relegation to By-Laws of details of administration, a reduction of the Board from thirty to twenty-five members, and a change in the method of nominating and electing officers.

PUBLICATIONS

Owing to the necessity for strict economy the method followed since 1896 of publishing all papers and discussions in *Proceedings* was abandoned in August, 1920. Papers and discussions were published as separate pamphlets, and forwarded only to those members who made special request for them. This

method effected a considerable saving and was probably the best that could have been followed in the emergency that confronted the Society. It was, however, only a temporary expedient, and better financial conditions enabled the Board to return to the former method beginning with *Proceedings* for August, 1921.

During the year, in addition to the usual ten numbers of *Proceedings*, separate pamphlets, and the Year Book, there have also been issued an Index to Vols. I–LXXXIII, (1867–1920), inclusive, of *Transactions*, and two volumes of *Transactions, viz.*, LXXXIII (1919–20) and LXXXIV (1921); these publications contained a total of 6 422 pages. The average number of pages published during the past five years was 4 263.

It is a matter of congratulation that the volume of *Transactions* for the current year was issued in November, and it is hoped that succeeding volumes may be published as promptly.

The stock of the various publications of the Society kept on hand for the convenience of members and others now amounts to 107 565 copies, the cost of which to the Society for paper and press work only has been $19 869.27. During the year lack of storage room occasioned the disposal of a number of volumes of *Transactions* at greatly reduced rates, to the benefit of members who had joined after the publication of these volumes.

SUMMARY OF PUBLICATIONS FOR 1921.

	Issues.	Average edition.	Total pages.	Plates.	Cuts.
Proceedings (monthly numbers)	8	10 680	1 834	6	141
Pamphlets (Papers, Discussions, Memoirs, Society Affairs)	65	330	453	1	91
Transactions, Vol. LXXXIII	1	10 000	2 479	39	560
Transactions, Vol. LXXXIV	1	10 500	993	1	219
Index to *Transactions*, Vol. I–LXXXIII	1	11 000	272	..	..
Year Book	1	11 000	391	1	..
Total	77	....	6 422	48	1 011

The cost of publications, as determined by the bills actually paid during the year, has been:

For Paper, Printing, etc., *Proceedings*	$24 395.86
For Paper, Printing, etc., of 32 650 Extra Copies of Papers, Discussions, Memoirs, Technical Lists	2 769.23
For Paper, Printing, etc., *Transactions*, Vol. LXXXIII (balance due)	11 164.39
For Paper, Printing, etc., *Transactions*, Vol. LXXXIV	7 117.84
For 8 050 Extra Copies of Separate Papers, *Transactions*, Vol. LXXXIII	715.44
For 8 950 Extra Copies of Separate Papers for *Transactions*, Vol. LXXXIV	907.27
Carried forward	$47 070.03

Brought forward	$47 070.03
For Binding*, Boxes, etc., *Transactions*, Vol. LXXXIII	9 627.48
For Binding*, Boxes, etc., *Transactions*, Vol. LXXXIV	1 878.87
For Plates and Cuts	2 034.72
For Paper, Printing, etc., Index to *Transactions*, Vols. I–LXXXIII.	3 071.79
For Binding*, Boxes, etc., Index to *Transactions*, Vol. I–LXXXIII.	1 415.58
For Year Book	7 044.90
For Copyright and Sundry Expenses	79.23
Total	$72 222.60
Deduct amount received from sale of publications	4 712.38
Net expenditure for publications for 1921	$67 510.22

MEETINGS

Twenty-three meetings were held during the year as follows: At the Annual Meeting, 2; at the Annual Convention, 2; and 19 other meetings all of which, except the Annual Convention, were held at the Society Headquarters in the Engineering Societies Building. At these meetings there were presented 7 formal papers, 3 of which were illustrated with lantern slides; 5 lectures and addresses, 3 of which were illustrated with lantern slides and 2 with lantern slides and motion pictures; and 4 discussions, 1 of which was illustrated with lantern slides. There were also published 10 papers and 2 Progress Reports of Special Committees which were not presented at any meeting of the Society. The number of members and others who took part in the preparation and discussion of these papers, lectures, addresses, discussions, and reports of Special Committees was 304.

The Annual Convention was held in Houston, Tex., from April 27th to 30th, 1921, inclusive.

The total attendance at the 19 meetings of the Society was about 3 334. The registered attendance at the Annual Meeting was 1 087, and at the Annual Convention 173.

The meetings of the Society durings the year were as follows:

January 5th, 1921, "Europe To-day—An Engineer's Impressions", by Edward J. Mehren, Affiliate, Am. Soc. C. E.

January 20th, 1921, "The Engineer, his Future and Relation to the Economic Life of America", by Francis H. Sisson, Vice-President, Guaranty Trust Company, New York City.

February 2d, 1921, "Construction of the World's Largest Hydro-Electric Units", by John Lyell Harper, M. Am. Soc. C. E.

March 2d, 1921, "Report of the New York–New Jersey Port and Harbor Development Commission", by Benjamin Franklin Cresson, Jr., M. Am. Soc. C. E.

April 6th, 1921, "The Battle of Meuse-Argonne", by Maj.-Gen. John A. Lejeune, Commandant, U. S. Marine Corps, Washington, D. C.

April 27th, 1921, "Engineering Activities of the Houston District", by E. E. Sands, M. Am. Soc. C. E.; and, "Municipal Engineering: Ad-

* Paper binding only.

dress at the Annual Convention at Houston, Tex., April 27th, 1921", by George S. Webster, President, Am. Soc. C. E.

May 4th, 1921, "Vertical Lift Bridges", by Ernest E. Howard, M. Am. Soc. C. E.

June 1st, 1921, "A Model Engineer Viewed as a Superior Mechanism", by S. Bent Russell, M. Am. Soc. C. E.

September 7th and 8th, 1921 (Three Sessions), "National Port Problems": A Discussion.

October 5th, 1921, "Rainfall and Run-Off Studies", by C. E. Grunsky, M. Am. Soc. C. E.; "The Flood of June, 1921, in the Arkansas River, at Pueblo, Colorado", by James Munn and J. L. Savage, Members, Am. Soc. C. E.; "The San Antonio Flood of September, 1921", by C. Terrell Bartlett, M. Am. Soc. C. E.

November 16th, 1921 (One Session), "Stream Pollution and Sewage Disposal": An Informal Discussion.

November 16th, 1921, "Odors and Their Travel Habits", by L. L. Tribus, M. Am. Soc. C. E.

November 17th, 1921 (One Session), A Symposium on "Water Supply and Water Purification".

December 7th and 8th, 1921 (Six Sessions), Discussion on the Progress Report of the Joint Committee on Standard Specifications for Concrete and Reinforced Concrete.

MEDALS AND PRIZES

For the year ending July, 1920, prizes were awarded as follows:

The Norman Medal to J. A. L. Waddell, M. Am. Soc. C. E., for his paper entitled "The Economics of Steel Arch Bridges".

The J. James R. Croes Medal to B. A. Smith, M. Am. Soc. C. E., for his paper entitled "Arched Dams".

The Thomas Fitch Rowland Prize to Charles Evan Fowler, M. Am. Soc. C. E., for his paper entitled "Revision of the Niagara Railway Arch Bridge".

The James Laurie Prize to Dabney H. Maury, M. Am. Soc. C. E., for his paper entitled "Water Supply for the Camps, Cantonments, and Other Projects Built by the Construction Division of the United States Army".

The Collingwood Prize for Juniors to Floyd A. Nagler, Jun. Am. Soc. C. S.,* for his paper entitled "Verification of the Bazin Weir Formula by Hydro-Chemical Gaugings".

LOCAL SECTIONS

There are at the present time 34 Local Sections, seven of which were organized during the year as follows:

Buffalo Section
Central Ohio Section
Kansas Section
Kansas City Section
Nashville Section
Northeastern Section
Oklahoma Section

A complete list of the Local Sections, with their officers, is published in each copy of *Proceedings*.

* Now Assoc. M. Am. Soc. C. E.

STUDENT CHAPTERS

There are at the present time 39 Student Chapters, thirty-one of which were organized during the year as follows:

Alabama Polytechnic Institute Student Chapter
Bucknell University Student Chapter
California Institute of Technology Student Chapter
Cornell University Student Chapter
Johns Hopkins University Student Chapter
Massachusetts Institute of Technology Student Chapter
New York University Student Chapter
Oregon State Agricultural College Student Chapter
Polytechnic Institute of Brooklyn Student Chapter
Purdue University Student Chapter
Rose Polytechnic Institute Student Chapter
Rutgers College Student Chapter
State University of Iowa Student Chapter
Swarthmore College Student Chapter
Syracuse University Student Chapter
University of California Student Chapter
University of Colorado Student Chapter
University of Illinois Student Chapter
University of Kansas Student Chapter
University of Kentucky Student Chapter
University of Maine Student Chapter
University of Minnesota Student Chapter
University of Nebraska Student Chapter
University of North Carolina Student Chapter
University of Pittsburgh Student Chapter
University of Texas Student Chapter
University of Washington Student Chapter
University of Wisconsin Student Chapter
Virginia Military Institute Student Chapter
West Virginia University Student Chapter
Yale University Student Chapter

FINANCES

In spite of the National economic depression and the large amount of unemployment among engineers generally, the financial condition of the Society has continued to improve. This is due to the substantial gain in membership during 1921 and the increase in dues of non-resident members.

The Society publications have been brought up to date during the year including Volumes LXXXIII and LXXXIV of *Transactions,* and an Index, at great expense, but, in spite of these heavy expenditures, there remains a cash balance on hand January 1st, 1922, practically the same as for the preceding year.

The Reports of the Acting Secretary and the Treasurer are appended.

By order of the Board of Direction,

ELBERT M. CHANDLER, *Acting Secretary.*

REPORT OF THE ACTING SECRETARY FOR THE

To the Board of Direction of the

Gentlemen:—I have the honor to present a statement of Receipts and Disbursements for the fiscal year of the Society, ending December 31st, 1921. There is also appended a general Balance Sheet showing the condition of the affairs of the Society.

Respectfully submitted,

Elbert M. Chandler,
Acting Secretary.

Receipts.

Balance on Hand, January 1st, 1921		$41 653.95
Entrance Fees	$19 070.00	
Current Dues	139 157.81	
Past Dues	5 698.09	
Advance Dues	46 741.29	
Binding	10 072.33	
Certificates of Membership	863.91	
Badges	4 222.62	
Sale of Publications	4 712.38	
Interest on Deposits	1 090.02	
Interest on Investments	522.75	
Annual Meeting	1 492.25	
Compounding Dues	600.00	
Rent from 57th Street Property	22 703.32	
Engineering News-Record to Establish Arthur M. Wellington Prize Fund	2 000.00	
Miscellaneous	1 035.78	
		259 982.55
		$301 636.50

YEAR ENDING DECEMBER 31st, 1921.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

DISBURSEMENTS.

Salaries of Officers	$10 099.98	
Clerical Help	39 736.41	
Publications	72 222.60	
Postage	13 953.42	
General Printing	10 472.24	
Office Supplies	2 976.56	
Badges	4 334.42	
Certificates of Membership	599.31	
Binding:		
Index and *Transactions* Vol. LXXXIII–LXXXIV.	17 805.96	
Reading Room	506.48	
United Engineering Society:		
Rent for 15th and 16th Floors	10 924.97	
Library	9 250.00	
Meetings and Miscellaneous	1 987.61	
Furniture	2 975.05	
Mileage:		
Directors	12 617.07	
Nominating Committee	1 831.20	
Work of Committees	11 418.21	
Am. Eng. Standards Committee	1 500.00	
Annual Meeting (Gross Cost)	4 263.59	
Annual Convention	1 329.40	
Prizes	346.70	
Interest on Mortgage	10 000.00	
Current Business	3 601.71	
Retirement Allowances	7 666.67	
Employment Bureau	3 000.00	
Investment	2 036.46	
Reimbursement to J. Parke Channing	2 750.00	
Miscellaneous	524.25	
		$260 730.27
Balance on Hand, December 31st, 1921:		
In Garfield National Bank	$39 406.23	
Cash on Hand	1 500.00	
		40 906.23
		$301 636.50

GENERAL BALANCE SHEET

ACCOMPANYING REPORT OF

ASSETS

Real Estate :			
One-fourth interest in U. E. S. real estate, 25 to 33 West 39th Street		$489 785.17	
Three lots (actual cost $185 406.20), estimated value		350 000.00	
Building, 220 West 57th Street, with improvements, at cost	$242 029.99		
Less reserve for depreciation	49 329.21	192 700.78	$1 032 485.95
Equipment :			
Furniture and office equipment	$40 657.11		
Less reserve for depreciation	10 848.48	$29 808.63	
Library :			
Cash expended for books, etc	$22 122.22		
Donations (estimated)	72 310.83	94 433.05	124 241.68
Investments :			
$10 000 New York City non-taxable 4¼% bonds		$10 000.00	
$2 300 U. S. Liberty Loan, Fourth, 4¼% bonds, at cost		1 996.00	11 996.00
Working assets :			
Publications on hand (inventoried cost)		$19 869.27	
Unexpired insurance premiums		192.64	20 061.91
Current assets :			
Cash, including $1 500 in hands of Secretary		$40 906.23	
Alfred Noble Memorial (loan)		1 200.00	
Members' accounts (past due)		20 207.23	
Miscellaneous accounts receivable		1 336.90	
Interest accrued on investments		161.15	63 811.51
			$1 252 597.05

We have audited the accounts of the AMERICAN SOCIETY OF CIVIL ENGI
estimate of the property valuation is correct), we certify that, in our opinion, the a
Society at that date.

NEW YORK, January 13th, 1922.

DECEMBER 31ST, 1921.

THE ACTING SECRETARY.

LIABILITIES

Dues for 1922 paid in advance		$46 741.29
Interest accrued on mortgage		4 166.70
Balance of donations on account of work of Special Committees		1 615.25
Mortgage payable, due January 27th, 1924		200 000.00
Funds:		
Fund invested in Society House, Lots and Library*	$31 415.78	
Herbert Steward Library Fund	2 000.00	
Joseph G. Swift " "	1 000.00	
Arthur M. Wellington Prize Fund	2 000.00	36 415.78
Surplus (including Reserve Fund of $7 000)		963 658.03
		$1 252 597.05

* Compounding Dues Fund, $15 155; Norman Medal Fund, $1 000; Rowland Prize Fund, $1 222.50; Collingwood Prize Fund, $1 000; Fellowship Fund, $13 038.28.

CIVIL ENGINEERS for the year ended December 31st, 1921, and (assuming that the opinion. the above balance sheet sets forth correctly the financial condition of the

LYBRAND ROSS BROS. & MONTGOMERY,
Accountants and Auditors.

REPORT OF THE TREASURER OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS FOR THE YEAR ENDING DECEMBER 31ST, 1921.

In compliance with the provisions of the Constitution, I have the honor to present the following report:

Cash on Hand, January 1st, 1921		$41 653.95
RECEIPTS.		
From current sources, January 1st to December 31st, 1921	$235 279.23	
Rent from 57th Street Property, January 1st to December 31st, 1921	22 703.32	
From *Engineering News-Record* to establish Arthur M. Wellington Prize Fund	2 000.00	$259 982.55
EXPENDITURES.		
Payment of bills by audited vouchers for current business, January 1st to December 31st, 1921	$255 943.81	
Reimbursement to J. Parke Channing	2 750.00	
Purchase of $2 300—4½% Liberty Loan Bonds	$1 996.00	
Accrued interest	40.46	2 036.46
Balance on Hand, December 31st, 1921:		
In Garfield National Bank	$39 406.23	
Cash on hand	1 500.00	40 906.23
		$301 636.50 $301 636.50

Respectfully submitted,

OTIS E. HOVEY,
Treasurer.

NEW BOOKS*

(From January 2d to January 31st, 1922)

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

DONATIONS TO ENGINEERING SOCIETIES LIBRARY

PROTECTIVE RELAYS.

By Victor H. Todd. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 274 pp., illus., diagrams, 8 x 6 in., cloth. $2.50.

This book attempts to cover the subject from first principles to the protection of high-tension networks, in a manner suited to the needs of operators and testers with a fair knowledge of electricity, and also of designers.

THEORY OF THE INDUCTION COIL.

By E. Taylor-Jones. Lond. and N. Y., Sir Isaac Pitman & Sons, Ltd., 1921. 217 pp., illus., 8 x 5 in., cloth. $3.50.

Until recently there has been much divergence of view as to the manner in which the high potential is generated at the secondary terminals of an induction coil when the primary current is interrupted, and it cannot be said even now that opinion on the subject is quite undivided. In this book an account is given of a theory of the action of induction coils first put forward by the author in 1909. The theory was originally intended to apply only to the case of an air-core induction coil having a condenser connected with its secondary terminals. Subsequent investigations have shown that it is also applicable to an ordinary induction coil.

SHORT COURSE IN THE TESTING OF ELECTRICAL MACHINERY.

By J. H. Morecroft and F. W. Hehre. Fourth Edition, Revised and Enlarged. N. Y., D. Van Nostrand Co., 1921. 220 pp., diagrams, 9 x 6 in., cloth. $3.00.

All students of engineering at Columbia University are required to take courses in testing direct and alternating-current machinery. These notes are prepared to meet the needs of students in mining, mechanical, and civil engineering, who have not studied the theory of electrical machinery, and hence need a brief summary of it as preparation for the laboratory work. Besides giving specific directions for the tests, a brief analysis of the characteristics of the machines is given. The new edition includes new material on batteries, illumination, measurement of electrical energy, and other subjects of interest to engineers generally.

HANDBUCH DER DRAHTLOSEN TELEGRAPHIE UND TELEPHONIE.

By Eugen Nesper. Berlin, Julius Springer, 1921. 2 vol., illus., diagrams, 10 x 7 in., cloth.

Dr. Nesper's book on radio communication attempts an exhaustive survey of the subject from a modern point of view and from every aspect. It is apparently more extensive than any previous work on the subject. It has been planned for easy reference, the material having been arranged so that each chapter is a complete account of a certain topic, so that reference to other chapters, or systematic reading of the whole work, can be avoided. The theory of radio communication, its history, uses, the measuring and detecting instruments, the physical phenomena in quasi-stationary circuits, coupling, damping, radiating, the technique and apparatus of high-frequency measurements are described in Vol. 1. Vol. 2 describes typical radio stations for different purposes, and their apparatus, the uses of radio communication in railroading, and radio telephony. It also includes a valuable bibliography of the important books and articles on the subject. Good indexes are provided.

EDGE MOOR WATER TUBE BOILER.

Edge Moor, Del., Edge Moor Iron Co., 1922. 153 pp., illus., 9 x 6 in., cloth.

In addition to technical information concerning the Edge Moor boiler and its merits, this volume contains data on oil firing, waste heat recovery, the properties of fuels, water purification, steam tables, etc.

AIRPLANE ENGINE.

By Lionel S. Marks. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 454 pp., diagrams, tab., 9 x 6 in., cloth. $6.00.

This volume attempts to formulate existing knowledge of the functioning of the airplane engine and its auxiliaries, and to present and discuss the essential constructive details of those engines, the excellence of which has resulted in their survival. Most of the material

* Unless otherwise specified, books in this list have been donated by the publishers.

is new, being based on the researches and developments that originated during the World War. Professor Marks has summarized and arranged the detailed data on the engine designs used in various countries, so that they are in convenient form for the designer.

HISTORY OF AERONAUTICS.

By E. Charles Vivian. N. Y., Harcourt, Brace and Co., 1921. 521 pp., pl., ports., 9 x 6 in., cloth. $5.00.

The author of this work says that hitherto there has been no attempt to furnish a detailed account of how the æroplane and the dirigible of to-day came into being, but each author has devoted his attention to some special phase or period. In this book, he attempts to record the facts of development and to state, as fully as is possible within the compass of a single volume, how flight and ærostation have evolved. Contents: The Evolution of the Aeroplane; 1903–1920; Progress in Design; Aerostatics; Engine Development.

MASCHINENUNTERSUCHUNGEN UND DAS VERHALTEN DER MASCHINEN IM BETRIEBE.

By A. Gramberg. Zweite, Erweitete Auflage. (Maschinentechnisches Versuchswesen, Bd. 2.) Berlin, J. Springer, 1921. 681 pp., illus., 9 x 6 in., cloth.

This book comprises Vol. 2 of the author's treatise on methods for testing machines, the first volume of which is devoted to measuring apparatus. This volume discusses methods of testing and the behavoir of machines while running. The subjects treated include boiler tests, fuel tests, heat conductivity, steam turbines, and reciprocating engines, exhaust steam utilization, internal combustion engines, pumping machinery, blowers, air compressors, and refrigerating machines. A section is devoted to regulation and governing, and an introductory section discusses the economic and legal aspects of tests. The work is intended to assist in the selection of proper tests, to describe correct tests, and to indicate how the results of costly tests can be fully analyzed.

METALLURGY OF ZINC AND CADMIUM.

By H. O. Hofman. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 341 pp., diagrams, tab., 9 x 6 in., cloth. $4.00.

This volume resembles the author's previous treatises on copper and lead in its general characteristics and, like them, is supplied with copious references to the literature. The work is designed to include recent advances in the metallurgy of zinc and cadmium, and to discuss these from a chemical as well as a technical point of view.

MANUAL OF FLOTATION PROCESSES.

By Arthur F. Taggart. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1921. 181 pp., diagrams, 9 x 6 in., cloth. $3.00.

Widespread understanding of the physical principles underlying flotation phenomena and of the diversity of flotation processes has been delayed, partly by the apparent complexity of the phenomena and the difficulties of investigation, and partly by the attitude of corporations owning patents on flotation processes. It is the purpose of this book, in part, to counteract the further spread of false conceptions, by setting forth some of the facts that contradict them, in part to describe apparatus and methods of testing which will aid investigators in their researches; and, finally, to give some generalizations from mill practice, by means of which the investigator may translate laboratory results into commercial operations.

ELEMENTS OF FRACTIONAL DISTILLATION.

By Clark Shove Robinson. (International Chemical Series.) N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 205 pp., diagrams, tab., 8 x 6 in., cloth. $2.50.

This book explains the principles of fractional distillation and illustrates them by carefully selected examples of their application. The first portion of the book treats of fractional distillation from the qualitative viewpoint of the phase rule; the second discusses some quantitative aspects from the engineering point of view; and the third section treats of the design of distilling apparatus. Part four gives examples of modern apparatus for distilling ammonia, benzolized wash oils, and alcohols. An Appendix of useful tables is included.

ATOMIC THEORIES.

By F. H. Loring. N. Y., E. P. Dutton and Co., 1921. 218 pp., illus., 9 x 6 in., cloth. $5.00.

The leading facts and theories relating to the atom, particularly those which, owing to their newness, have not yet been treated at any length in textbooks, are brought together in one volume for the convenience of students and investigators. The book covers a wide range of subjects. These include the quantum theory, *Sir* J. J. Thomson's recent views of mass, matter, and radiation, the Bohr theory, the octet theory, isotopes, the Brownian movement, ionisation, potentials, solar phenomena, and other subjects. References are given throughout, which enable the reader to follow any subject of special interest.

LA MATIÈRE ET L'ÉNERGIE SELON LA THÉORIE DE LA RELATIVITÉ

Et La Théorie des Quanta. By Louis Rougier. Nouvelle Edition, Revue et Augmentée. Paris, Gauthier-Villars et Cie., 1921. 112 pp., 10 x 7 in., paper. 9.50 francs.

This book calls attention to the most paradoxical and least discussed consequence of the principle of relativity, that which attributes mass, weight, and structure to energy. What we call matter thus becomes only a particular case of energy. The old duality of ponderable and imponderable makes way for that of the electro-magnetic field or energy, of which radiation and matter are simple modalities, and of the field of gravitation or space as defined by Einstein. Professor Rougier presents these theories in this work.

PHYSIQUE ÉLÉMENTAIRE ET THÉORIES MODERNES.

By J. Villey. Part 1: Molécules et Atomes. Paris, Gauthier-Villars et Cie., 1921. 197 pp., 10 x 6 in., paper. 15 francs.

The author has prepared a work, less scholastic than usual textbooks and more suited for reading, in which the essential phenomena of physics are set forth and explained by the most modern theories. Attention is especially directed to those phenomena which have received industrial application. The work is intended for the general public desirous of information about the fundamentals of physics and modern theories, as well as for use as a textbook.

INDUSTRIAL FATIGUE AND EFFICIENCY.

By H. M. Vernon. Lond., George Routledge & Sons, Ltd.; N. Y., E. P. Dutton & Co., 1921. 264 pp., tab., 9 x 6 in., cloth. $5.00.

The author, who is an investigator for the Industrial Fatigue Research Board of Great Britain, presents a fairly complete account of present knowledge concerning industrial fatigue and its influence on efficiency. The information adduced relates only to shop practice, as laboratory investigations have not, in the author's opinion, afforded much evidence of practical value.

SYSTEM BUILDING AND CONSTRUCTIVE ACCOUNTING.

By Raymond D. Willard. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 307 pp., forms, 9 x 6 in., cloth. $4.00.

A textbook for students of accounting, devoted to the design of systems for various lines of business. The book analyzes a number of systems in use, thus illustrating the principles involved, and illustrates by charts and forms, suitable methods for the necessary records.

ESSENTIALS OF INDUSTRIAL COSTING.

By George S. Armstrong. N. Y., D. Appleton and Co., 1921. 297 pp., tab., forms, 9 x 6 in., cloth. $5.00.

As indicated by the Contents, this book is concerned solely with the principles and methods by which the cost of production may be determined. It is based on an extended experience in many different industries and represents the author's mature views. The book shows the purpose of costing, summarizes good practice, and is a guide to the analysis necessary for the establishment of costing systems. Contents: Economic Development and Necessity of Costing; The Purpose and Function of Costing; The Mechanism of Costing; Elements of Costing and Sources of Costing Data; The Costing of Material; The Costing of Labor; The Collection of Expense in Costing; The Costing of Depreciation, Interest, and Power; The Distribution and Application of Expense in Costing; Final Costing; The Connection of Costing with the General Books and the Preparation of Monthly Statements Therefrom.

DESCRIPTIVE GEOMETRY.

By George Young and H. E. Baxter. N. Y., The Macmillan Co., 1921. 310 pp., diagrams, 8 x 5 in., cloth. $3.25.

Believing that the chief value of descriptive geometry lies in its imaginative quality, these authors present it so as to develop the imagination; and, therefore, they encourage intuitive rather than rigidly formal methods. The treatment has been kept purely abstract, in order to avoid the tendency of the subject to degenerate into practical rules and formulas; but introductory matter showing the relation of the principles under discussion to structural work is provided, and exercises to show the application of the abstract ideas to concrete, practical problems are included.

VALUATION OF AMERICAN TIMBERLANDS.

By K. W. Woodward. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1921. 246 pp., maps, 9 x 6 in., cloth. $3.00.

Gives the principal facts regarding the timber resources of the Continental United States and its outlying territories, excepting Hawaii and the Canal Zone, in a form suited to the needs of investors, timber cruisers, and students of forestry. Contains descriptions of the forest types of the country, and comparisons of their values.

MOTOR TRUCK TRANSPORTATION.

By F. Van Z. Lane. N. Y., D. Van Nostrand Co., 1921. 153 pp., illus., 9 x 6 in., cloth. $2.00.

A practical presentation of the principles of truck operating cost; operating efficiency, and cost records; operating cost laws; truck details, such as bodies, loading, and unloading devices, trailers and semi-trailers, and tires; and the factors that determine the fields of economical operation. Gives no attention to design or manufacture.

COTTON FACTS.

Compiled and Edited by Alfred B. Shepperson. Revised and Enlarged by C. W. Shepperson. N. Y., Shepperson Publishing Co., 1921. 180 pp., port., map, 7 x 4 in., cloth.

A convenient compilation of commercial and financial information required by those engaged in the cotton industry, which has appeared annually for forty-six years.

SEWERAGE AND SEWAGE DISPOSAL.

By Leonard Metcalf and H. P. Eddy. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 598 pp. illus., diagrams, 9 x 6 in., cloth. $5.00.

This work is practically a one-volume abridgment of the three-volume treatise "American Sewerage Practice", published by these authors in 1914–1915. It is intended for class use in engineering schools, but reflects the viewpoint of the engineer, not the teacher, and presents the information that its authors believe young students should acquire before taking up work in the field of sewerage engineering.

CONSTRUCTION, COST KEEPING AND MANAGEMENT.

By Halbert Powers Gillette and Richard T. Dana. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 572 pp., forms, 8 x 5 in., cloth. $5.00.

This book has been prepared in response to requests for a second edition of "Cost Keeping and Management Engineering". It contains nearly all the original material, supplemented by that developed in the last twelve years. It is intended to assist in reducing construction costs to the minimum, by explaining the rules of management and setting forth suitable methods of cost keeping, adapted to engineering construction.

DESIGN OF STEEL MILL BUILDINGS AND THE CALCULATION OF STRESSES

In Framed Structures. By Milo S. Ketchum. Fourth Edition, Rewritten. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1921. 632 pp., illus., diagrams, 9 x 6 in., fabrikoid. $6.00.

The subject-matter of this book covers the calculation of the stresses in framed structures and also the design of buildings having a self-supporting steel frame with a light covering, usually fireproof. In this edition, the book has been rewritten, enlarged, and reset. It is intended as a textbook in structural engineering and also as a book of reference for engineers. Part 1 covers the calculation of the stresses in simple beams, trusses, portals, the transverse bent, and the three-hinged arch. Part 2 covers the calculation of the deflections of structures, the stresses in statically indeterminate girders, trusses and frames, and secondary stresses in trusses. Part 3, covers the design of steel frame buildings for mines, mills, smelters, and other industrial plants. The Appendix is a complete specification for steel frame mill buildings.

ARCHITECTS' AND BUILDERS' HANDBOOK.

By Frank E. Kidder. Seventeenth Edition. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1921. 1907 pp., illus., tab., 7 x 4 in., fabrikoid. $7.00.

Two new chapters, on "Specifications for the Steelwork of Buildings", and on "Domical and Vaulted Structures", have been prepared for this edition. The chapters on "Fireproofing of Buildings" and on "Reinforced-Concrete Construction" and the sections on "Heating and Ventilation" and on "Chimney Construction" have been rewritten. In addition, the whole text has been revised, numerous new articles inserted, and a new index made. The total additions amount to 90 pages. The book is intended to contain information on every subject, except design, likely to come before an architect, structural engineer, draftsman, or builder, and to be a thorough handbook of architectural engineering.

DIE EISENKONSTRUKTIONEN.

By L. Geusen. Dritte, Verbesserte Auflage. Berlin, Julius Springer, 1921. 282 pp., diagrams, tab., 11 x 8 in., cloth. 384 marks.

This textbook for students of structural engineering is divided into three sections, treating, respectively, of the principles of steel buildings and of bridges. By this arrangement the general rules and methods governing steel structures are taught first and emphasized by suitable problems taken from practice. The application of these methods in framing buildings and bridges is considered in the later sections. The text is concise and illustrated by numerous drawings. An appendix contains the necessary tables of the properties of structural shapes.

HYDRAULICS AND ITS APPLICATIONS.

By A. H. Gibson. New Edition, Revised and Enlarged. N. Y., D. Van Nostrand Co., 1921. 813 pp., illus., diagrams, 9 x 6 in. cloth. $6.00.

This book opens with a description of the physical properties of water, followed by a brief treatment of the fundamentals of hydrostatics. The science of hydraulics is then presented, first theoretically, and then with regard to its application to the design of hydraulic machinery. The work is written primarily for students, but the author hopes it may also prove of value to those actively engaged in the practice of hydraulic engineering. This edition has been practically rewritten, with considerable additions and much re-arrangement of the material.

DIE WASSERVERSORGUNG DER STÄDTE.

By O. Smreker. Fünfte Auflage. (Handbuch der Ingenieurwissenschaften. Teil 3, Der Wasserbau, Bd. 3.) Leipzig, Wilhelm Engelmann, 1914. 522 pp., illus., diagrams, tab., 10 x 7 in., cloth. 57 marks.

This work forms the third of the twelve volumes upon Hydraulic Engineering which constitute the third section of the "Handbuch der Ingenieurwissenschaften", and is concerned with municipal water supplies. The present edition has been thoroughly revised, both with respect to arrangement and contents. The arrangement follows the course of operations used in securing a water supply, discussing first the preliminary studies of the amount, quality, and occurrence of the available sources, then the design of the plant in general. Succeeding chapters discuss the winning and purification of water, pumping, and conveying, and the operation of water-works. Attention is directed toward general principles, rather than to the details of specific installations.

DONATIONS TO THE READING ROOM

TRAIN OPERATION BY SIGNAL INDICATION.

By Henry M. Sperry, M. Am. Soc. C. E. N. Y., 1919–20. 3 pamphlets, illus., 11 x 8½ in., pap. (Gift of the Author.)

These pamphlets bring together scattered facts and arguments concerning train despatching and signaling. The author proposes to abandon all written orders and to extend the practice of conveying instructions to enginemen entirely by means of signal arms supported on roadside posts. The Contents are: Bulletin No. 1, Train Operation by Signal Indication; Susquehanna Division, Erie Railroad; Bulletin No. 2, Pt. 1, What Time Saved by Signals Means in Equipment; Pt. 2, What Does It Cost to Stop a Tonnage Train?; Bulletin No. 3, Pt. 1, The Two Principal Methods of Directing Train Movements; Pt. 2, Directing Train Movement by Signal Indication.

MEMBERSHIP

(From January 4th to January 31st, 1922)

ADDITIONS

		Date of Membership.
HONORARY MEMBERS		
LUIGGI, LUIGI. Insp. Gen. of Civ. Engrs.; Prof. of Hydr. Eng., Univ. of Rome; Member of the International Technical Committee for the Suez Canal, 68-B Via Nomentura, Rome, Italy....	M.	Feb. 7, 1906
	Hon. M.	Oct. 10, 1921
MEMBERS		
BLOECHER, THEODORE, JR., Div. Engr., B. & O. R. R., 4005 Garrison Boulevard, Baltimore, Md....	M.	Jan. 16, 1922
BURNEY, ROBERT LEE. Gen. Contr. (Walsh & Burney), 303 Calcasieu Bldg., San Antonio, Tex....	Assoc. M.	April 7, 1915
	M.	Jan. 20, 1922
BYRNES, HARRY CADY. Div. Engr., State Highway Dept., Room 128, Court House, Pueblo, Colo....	Assoc. M.	Oct. 11, 1920
	M.	Jan. 20, 1922
CAUGHEY, ROBERT ANDREW. Associate Prof. of Structural Eng., Iowa State Coll., 224 Stanton Ave., Ames, Iowa....	Assoc. M.	April 14, 1919
	M.	Jan. 20, 1922
CONNER, PERLEY EUGENE. Contr. Engr., Chicago Office, States Contr. Co., 122 South Michigan Ave., Chicago, Ill....	Assoc. M.	April 14, 1919
	M.	Jan. 20, 1922
COULTER, WALDO SCARLETTE. Cons. Engr., 114 Liberty St., New York City (Res., 90 Fenimore St., Brooklyn, N. Y.)....	Assoc. M.	May 6, 1908
	M.	Jan. 20, 1922
GANDOLFO, JOSEPH HARRINGTON. Constr. Mgr., Div. of Architecture and Constr., Dept. of Institutions and Agencies, State of New Jersey, 142 West State St., Trenton, N. J....	Assoc. M.	Oct. 2, 1907
	M.	Jan. 20, 1922
HARWI, SOLOMON JACOB. 910 Ave. C, Bayonne, N. J.	Jun.	Dec. 4, 1889
	M.	Jan. 16, 1922
HOPKINS, JOHN THOMAS. Chf. Engr. and Mgr., Hopkins Constr. Corporation, 40 Paterson St., New Brunswick, N. J....	Assoc. M.	June 16, 1919
	M.	Jan. 20, 1922
JONES, JOSEPH WARREN. Mgr., Austin Bros., Box 1328, Dallas, Tex....	Assoc. M.	Jan. 2, 1912
	M.	Jan. 20, 1922
KELLY, WILLIAM. Col., Corps. of Engrs., U. S. A.; Chf. Engr., Federal Power Comm., Interior Bldg., Washington, D. C....	Assoc. M.	Feb. 3, 1904
	M.	Jan. 20, 1922
KENNISON, KARL RAYMOND. Cons. Engr., 25 Pemberton Sq., Boston, Mass....	Assoc. M.	Jan. 6, 1915
	M.	Jan. 20, 1922
KENT, HERBERT VAUGHAN. Cons. Engr., 17 Hanover Sq., London, W. 1, England....		Jan. 19, 1920
MALSBURY, OMER EVERT. Asst. Engr., Head of Section of Surveys, Panama Canal, Balboa Heights, Canal Zone, Panama....	Jun.	Feb. 5, 1907
	Assoc. M.	Feb. 4, 1914
	M.	Nov. 21, 1921
MARCELLUS, JONTA BOEN. Associate Prof., Civ. Eng., Univ. of Colorado, Coll. of Eng., Boulder, Colo....		Sept. 12, 1921
MORRISON, ROGER LEROY. Secy., Treas., and Gen. Mgr., The Concrete Products Co., 4717 First Ave., Birmingham, Ala....	Jun.	April 4, 1911
	Assoc.	Mar. 2, 1915
	Assoc. M.	Sept. 11, 1917
	M.	Jan. 20, 1922

MEMBERS—(*Continued*)

		Date of Membership.
NICHOLS, CHARLES SABIN. Prof., San. and Hydr. Eng., Iowa State Coll., 830 Hodge Ave., Ames, Iowa	Assoc. M.	June 18, 1918
	M.	June 6, 1921
NOYES, STEPHEN HENLEY. Asst. Engr., in Chg. of Bridge Div., Bureau of Surveys, Dept. of Public Works, City Hall, Philadelphia, Pa.	Jun.	Oct. 1, 1907
	Assoc. M.	Feb. 6, 1912
	M.	Jan. 20, 1922
RATHBUN, JOHN CHARLES. Asst. Prof., Civ. Eng., Univ. of Washington, 4034 University Way, Seattle, Wash.	Jun.	Oct. 6, 1908
	Assoc. M.	May 6, 1914
	M.	Sept. 12, 1921
SMITH, ALVA J. City Engr. and Water Supt., 619 East 6th Ave., Emporia, Kans.		Jan. 16, 1922
SPELMAN, JOHN RODGERS. Cons. and Superv. Engr., 405 Lexington Ave., New York City (Res., 219 Lakeview Ave., Rockville Centre, N. Y.)	Assoc. M.	Dec. 6, 1910
	M.	Jan. 20, 1922
THOMPSON, GUSTAVUS WILLIAM. Pres., Thompson & Binger, Inc., 317 Gurney Bldg., Syracuse, N. Y.	Assoc. M.	July 9, 1912
	M.	Jan. 20, 1922
WARNER, ELWIN STREETER. Highway Engr., Bureau of Public Roads, Dist. No. 6, Care, State Highway Dept., Austin, Tex.	Assoc. M.	Oct. 1, 1913
	M.	Nov. 21, 1921

ASSOCIATE MEMBERS

ANDERSON, BJARNE BERGSLAND. Care, Am. Bridge Co., 30 Church St., New York City	Jun.	Oct. 14, 1919
	Assoc. M.	Jan. 16, 1922
ANDERSON, JOHN DAVID. Engr., Dwight P. Robinson & Co., Inc., 125 East 46th St., New York City (Res., 1075 Prospect Pl., Brooklyn, N. Y.)		Jan. 16, 1922
BRALY, RAYMOND FIELDING. Vice-Pres., Concrete Products Co. of New Jersey, Box 248, Spring Lake, N. J.	Jun.	Nov. 28, 1916
	Assoc. M.	Jan. 16, 1922
CHILDS, JAMES HENDERSON. 532 Eldorado St., Pasadena, Cal.		Nov. 21, 1921
DOUGLAS, FREDERICK WILLIAM. With The Foundation Co., 525 West 124th St., New York City		Jan. 16, 1922
FISHER, ROBERT RAYMOND. Engr., The Trewhitt-Shields Co., 435 Rowell Bldg., Fresno, Cal.		Jan. 16, 1922
HAMILTON, ANDREW CLAUDE, JR. Cons. Engr. (Hamilton & Shreve), Fayetteville, Ark.		June 6, 1921
LEWIS, FRED JUSTIN. Asst. Prof., Civ. Eng., Lehigh Univ., 1239 Russell Ave., South Bethlehem, Pa.		Nov. 21, 1921
MCMULLEN, ERNEST WILLIAM. Executive Engr., Monks & Johnson, Boston (Res., 60 Parkton Rd., Jamaica Plain), Mass.		July 11, 1921
MOHR, WILLIAM HENRY. Plant Mgr., Lehigh Structural Steel Co., 10 North 13th St., Allentown, Pa.		Nov. 21, 1922
OLIVER, GEORGE EDWIN. Drainage Engr., Monona County, Onawa, Iowa.		Jan. 16, 1922
PAGENHART, EDWIN HERBERT. Hydrographic and Geodetic Engr., U. S. Coast and Geodetic Survey, Box 2512, San Francisco, Cal.		Nov. 21, 1921
ROLLINS, JOSEPH GUY. Res. County Engr., Stephens County, Box 8, Breckenridge, Tex.		Jan. 16, 1922
RUSSELL, WALTER CLAIR. Asst. Engr. in Chg. of Sewers, Eng. Dept., City of Flint, 833 East Eighth St., Flint, Mich.		Jan. 16, 1922

ASSOCIATE MEMBERS—(*Continued*)

	Date of Membership.
SCHLICH, OTTO STEPHEN. Asst. Engr., White Constr. Co., 95 Madison Ave., 16th Floor, New York City	Jan. 16, 1922
SMITH, GORDON PITMAN. Cons. Engr., 502 Central Bank Bldg., St. Paul, Minn	Nov. 21, 1921
SPENCER, EARL MILTON. Chf. Engr. and Gen. Mgr., F. M. Spencer & Son, 10th and Van Buren Sts. (Res., 1165 College Ave.), Topeka, Kans.	Jan. 16, 1922
SWEENEY, JOHN JOSEPH. Prof. of Civ. Eng., Villanova Coll., Villanova (Res., 5627 Kingsessing Ave., Philadelphia), Pa.	Jan. 16, 1922
TRIERWEILER, FRANK FREDERICK. Engr. and Contr. (Monson-Trierweiler Co., Inc.), 419 Railway Exchange Bldg., Portland, Ore.	Jan. 16, 1922
WASHBURN, FRITZ LEROY. Asst. Cons. Engr., City of Decatur, Dept. of Streets and Public Impvts., 1133 North Edward St., Decatur, Ill.	Jan. 16, 1922
WEITZNER, HENRY MITCHELL. 145 West 45th St., New York City	Jun. May 28, 1912 Assoc. M. Jan. 16, 1922
WYLIE, PAUL EUGENE. 3712 Eighth St., Des Moines, Iowa	Jan. 16, 1922

JUNIORS

GARRISON, SYDNEY WOOD. Draftsman and Instrumentman, State Highway Comm., Raleigh, N. C.	Nov. 21, 1921
GORNTO, EARL DOUGLAS. Asst. Engr., M. of W., Virginia Ry. & Power Co., 1109 Huntington Crescent, Norfolk, Va.	Nov. 21, 1921
GREENE, BARCLAY ADAMS. Mgr., Cement Gun Dept., Pratt-Thompson Constr. Co., 500 Republic Bldg., Kansas City, Mo.	Nov. 21, 1921
LEWIS, ELBERT FRANCIS. Junior Hydrographic and Geodetic Engr., U. S. Coast and Geodetic Survey, Care, U. S. S. *Wenonah*, 202 Burke Bldg., Seattle, Wash.	Nov. 21, 1921
MACKENZIE, RAY ELLIOTT. 103 Victoria Ave., Charlotte, N. C.	Jan. 16, 1922
MARSHALL, WILLIAM EDWARD. 1908 Penn Ave., Pittsburgh, Pa.	Jan. 16, 1922
MELOY, THOMAS. Asst. to J. A. L. Waddell; Am. Member, Chinese Yellow Bridge Comm.. Bank de l'Indo Chine, Peking, China.	Oct. 10, 1921
ROBINSON, PERCY RALPH. Asst. Engr., Sir William Arrol & Co., Ltd., 12 Edmund St., Rochdale, England	Nov. 21, 1921
ROSS, KENNETH WARD. Designing Draftsman, George F. Hardy, 309 Broadway, New York City	Oct. 10, 1921
THOMAS, CHARLES OSCAR. Res. Engr., Divisions 1 and 2, Little Rock Hot Springs Highway, Box 322, Benton, Ark.	Oct. 10, 1921
WADDINGTON, JOHN CROSSLEY. Chellow Dene, Barnsley Rd., Sheffield, England	Nov. 21, 1921

REINSTATEMENTS

MEMBERS

	Date of Reinstatement.
PRATT, MASON DELANO	Jan. 16, 1922
REED, HENRY BUDD	Jan. 16, 1922

ASSOCIATE MEMBERS	Date of Reinstatement.
Rea, Richard Willis	Jan. 16, 1922

RESIGNATIONS

MEMBERS	Date of Resignation.
Alexander, Henry David	Dec. 31, 1921
Boggs, Edward Marshall	Dec. 31, 1921
Conner, Arthur Watson	Dec. 31, 1921
Connor, William Durward	Dec. 31, 1921
Hendrick, Calvin Wheeler	Dec. 31, 1921
Jervey, Henry	Dec. 31, 1921
Leitch, John	Dec. 31, 1921
Lipsey, Thomas Eugene Leard	Dec. 31, 1921
May, Edward Abner	Dec. 31, 1921
Noble, Theron Augustus	Dec. 31, 1921
North, Arthur Tappan	Dec. 31, 1921
Phillips, William Renton	Dec. 31, 1921
Ripley, Joseph	Dec. 31, 1921
Roberts, Shelby Saufley	Dec. 31, 1921
Taylor, Benjamin Henry	Dec. 31, 1921
Tenney, Arthur Arnold	Dec. 31, 1921
Thornton, Charles James	Dec. 31, 1921
Zinn, George Arthur	Dec. 31, 1921

ASSOCIATE MEMBERS	
Allardice, Elliott Ritchie Barclay	Dec. 31, 1921
Barker, Edgar Earl	Dec. 31, 1921
Bowen, Edmund Ignatius	Dec. 31, 1921
Bowman, Ralph McLane	Dec. 31, 1921
Bradbury, Richard Robertson	Dec. 31, 1921
Bradley, William Littell	Dec. 31, 1921
Bunnel, William Cyrus	Dec. 31, 1921
Buzzell, Josiah William	Dec. 31, 1921
Campbell, Thomas Francis	Dec. 31, 1921
Canfield, George Hathaway	Dec. 31, 1921
Giquel, Rafael Sanchez	Dec. 31, 1921
Gray, Edward	Dec. 31, 1921
Gray, John Lathrop	Dec. 31, 1921
Hanique, Jules Edmond	Dec. 31, 1921
Harper, Isaac Onward	Dec. 31, 1921
Howland, Leon David	Dec. 31, 1921
Irvine, Frederick Brice	Dec. 31, 1921
Johnson, Harvey Stone	Dec. 31, 1921
Koester, Edwin Ferdinand	Dec. 31, 1921
Lee, Augustine Leftwich	Dec. 31, 1921
Lehfeldt, Walt Ferd	Dec. 31, 1921
Maier, Harry Ludwig	Dec. 31, 1921
Martin, Charles William	Dec. 31, 1921

ASSOCIATE MEMBERS—(*Continued*)	Date of Resignation.
MICHAEL, HERBERT LEDLIE	Dec. 31, 1921
MILLER, MAX MERRILL	Dec. 31, 1921
MOSES, CARROLL	Dec. 31, 1921
MYERS, CHESTER JOHN	Dec. 31, 1921
NELSON, WILLIAM	Dec. 31, 1921
NORTON, JOHN EVERED	Dec. 31, 1921
PEABODY, GEORGE ALFRED	Dec. 31, 1921
PLUMLEY, STUART	Dec. 31, 1921
ROCKWELL, HARLOW LOVERIDGE	Dec. 31, 1921
SCHENSTROM, WILLIAM ROLF OSCAR HOLMBOE	Dec. 31, 1921
SHREVE, RALPH FEBREY	Dec. 31, 1921
SHUTE, JAMES SELDEN	Dec. 31, 1921
SMITH, JULIEN	Dec. 31, 1921
SOVEREIGN, HARRY EVANS	Dec. 31, 1921
STARK, JOHN VASSAR	Dec. 31, 1921
STARKWEATHER, ALFRED KENNETH	Dec. 31, 1921
STEVENSON, ERVIN BEECHER	Dec. 31, 1921
TOLMAN, EDWARD MAYO	Dec. 31, 1921
TOWLE, FOSTER	Dec. 31, 1921
WALLACE, EDWARD EWING	Dec. 31, 1921
WRIGHT, THOMAS TEMPLE	Dec. 31, 1921
AFFILIATES	
BROWN, JOSEPH HENRY	Dec. 31, 1921
CHURCH, HOWARD EMERSON	Dec. 31, 1920
COLBY, SAFFORD KINKEAD	Dec. 31, 1921
HENRY, SMITH TOMPKINS	Dec. 31, 1921
HUGHES, HAROLD LINCOLN	Dec. 31, 1921
OLDS, WILLIAM CLARENCE	Dec. 31, 1921
JUNIORS	
BAKER, AVEY MARTIN	Dec. 31, 1921
BRICKLIN, SIMON	Dec. 31, 1921
CAREY, MATTHEW LAWRENCE	Dec. 31, 1921
CHRISTIAN, VALENTINE	Dec. 31, 1921
GODFREY, ALEXANDER HOLLIS	Dec. 31, 1921
HARTLINE, WILLIAM RAYMOND	Dec. 31, 1921
KOHL, FRANK EDWARD, JR	Dec. 31, 1921
LIPARI, ATTILIO FELIX	Dec. 31, 1921
OATMAN, FRANKLYN WILLIAM	Dec. 31, 1921
OSTROM, CHARLES DOUGLAS YELVERTON	Dec. 31, 1921
PRIDE, HAROLD ELLWOOD	Dec. 31, 1921
RANDOLPH, JAMES ROBBINS	Dec. 31, 1921

DEATHS

BELL, HAROLD INGERSOLL. Elected Associate Member, August 31st, 1915; died December 28th, 1921.

BLENUS, ANSON MORSE. Elected Associate Member, July 6th, 1920; died January 5th, 1922.

DEATHS—(*Continued*)

KING, CLIFFORD MARSHALL. Elected Junior, March 6th, 1906; Associate Member, July 1st, 1909; died January 2d, 1922.

RUTH, ABRAHAM JOHN. Elected Associate Member, March 4th, 1913; died November 3d, 1921.

SELTZER, HARRY KENT. Elected Junior, February 4th, 1896; Associate Member, January 2d, 1901; Member April 3d, 1906; died December 30th, 1921.

THORNTON, EDMUND ABIEL. Elected Associate Member, November 4th, 1914; died January 9th, 1922.

TYSON, ANDERSON HARVEY. Elected Member, October 2d, 1889; died January 12th, 1922.

WHITAKER, DEBERNIERE. Elected Member, October 1st, 1912; died December 25th, 1921.

WRIGHT, CHARLES ALBERT LORING. Elected Member, October 10th, 1916; died August 17th, 1921.

Total Membership of the Society, January 31st, 1922, 10 263.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

Owing to pressure of work, due to the Annual Meeting, it has been necessary to omit this list in this issue. The items for both February and March will be published in *Proceedings* for March, 1922.